# Methods of Designing Justice-oriented Interactive AI Systems

Jay L. Cunningham

A dissertation
submitted in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy

University of Washington

2024

Reading Committee:
Julie A. Kientz, Chair
Daniela K. Rosner, Chair
Alicia B. Wassink

Program Authorized to Offer Degree:
Human Centered Design and Engineering

University of Washington

## Abstract

Methods of Designing Justice-oriented Interactive AI Systems

Jay L. Cunningham

Co-Chairs of the Supervisory Committee:
Julie A. Kientz
Human Centered Design and Engineering

Daniela K. Rosner
Human Centered Design and Engineering

The rise of artificial intelligence (AI) technologies has introduced concerns about the perpetuation and exacerbation of existing racial inequities. Although AI promises innovative advances, its design and implementation often reflect and amplify societal biases, disproportionately impacting marginalized groups, particularly Black individuals and groups of people. My dissertation explores this critical issue through examining how racial inequity manifests in two prominent interactive AI systems: banking applications and AI-enabled language tools.

Existing research reveals shortcomings in current technology design practices, particularly in fostering accountability and inclusivity for underrepresented minority communities. While human-centered AI methods offer valuable tools, they may fall short in addressing the complex socio-cultural contexts of marginalized user groups. To bridge this gap, my dissertation contributes a provisional Techno-Realist Innovation Framework, a human-centered approach that integrates social justice principles into AI research and design. Through three distinct investigations, I explore the experiences of African American users with interactive AI systems, highlighting their unique challenges, benefits, and cultural assets. This research culminates in a reflective analysis and a methodological proposal for accountable community-based collaboration, emphasizing the importance of diverse community knowl-

edge and participation in shaping technological innovation. By centering the voices and perspectives of marginalized groups, my dissertation seeks to pave the way for more just, equitable, and socially responsible AI systems.

# Table of Contents

Page

List of Figures . . . . . iv

List of Tables . . . . . v

Chapter 1: Introduction . . . . . 1
1.1 Research Motivation and Context . . . . . 2
1.2 A Personal Journey Towards Justice-Oriented Design . . . . . 2
1.3 Who is the Black Tech User? . . . . . 3
1.4 Dissertation Overview . . . . . 5
1.5 Dissertation Thesis Statement . . . . . 6
1.6 Dissertation Thesis Research Questions . . . . . 9
1.7 Dissertation Chapters . . . . . 9

Chapter 2: Theory and Literature Review . . . . . 11
2.1 Traditions of Human Centered AI Design Research . . . . . 12
2.2 Racial Inclusion and Fairness in Artificial Intelligence and Human-Computer Interaction . . . . . 14
2.3 Theorizing Assets of Race, Human Values, and Culture in Socio-Technical System Design . . . . . 21
2.4 Designing Toward Community Culture and Assets . . . . . 24
2.5 Literature Review Summary . . . . . 36

Chapter 3: Exploring Black User Experiences and Needs with Digital Banking Services and Financial Applications . . . . . 40
3.1 Introduction . . . . . 40

3.2 Related Work . . . 43
3.3 Methods . . . 49
3.4 Findings . . . 58
3.5 Discussion . . . 77
3.6 Conclusion . . . 86

Chapter 4: Advancing Data Equity: Responsibility and Representation in NLP Data Practices . . . 88
4.1 Introduction . . . 88
4.2 Related Work . . . 91
4.3 Study Aims . . . 95
4.4 Methods . . . 96
4.5 Findings . . . 103
4.6 Discussion . . . 132
4.7 Conclusion . . . 144

Chapter 5: Co-Development of Socially Responsible Research through Black Community Advisory: An Introspective Essay . . . 146
5.1 Student transplant turned civic technology researcher . . . 147
5.2 My beginnings with civic leadership and community engagement . . . 151
5.3 Applying the Sustained Dialogue Approach to Facilitate Community-based Participatory Research and Design in Technology . . . 154
5.4 UW HCDE Black Community Advisory Board . . . 156
5.5 A Researcher's Reflection . . . 177
5.6 In Closing: I Hope I've Done Some Justice . . . 186

Chapter 6: Discussion and Conclusion: Toward a Techno-Realist Innovation Framework . . . 189
6.1 A Techno-Realist Innovation Framework for Human-Centered Technology Research and Design . . . 190
6.2 The Culture of Technology Innovation . . . 199
6.3 Human-Centered Computing and Problem Solving . . . 200
6.4 Ontologies of Blackness and Human-Centered Technologies . . . 201
6.5 Shifting Focus: Joy, Liberation, and Justice in Technological Innovation . . . 203

6.6 Get Real: Toward Techno-Realism in Technology Research and Design Innovation . . . . . 205
6.7 Conclusion: Forging a Path Towards Justice-Oriented AI . . . . . 209

# List of Figures


Figure Number Page

3.1 Overview of participants who completed the diary study, the interview, or both 57
3.2 Overview of the 285 Cash App transactions reported across the 4 weeks of the diary study . . . . . 60

4.1 Focus Group Participant Guidebook Cover . . . . . 101
4.2 Data Annotator's Performance Measurement . . . . . 111
4.3 Factors to Consider for Improve Representation and Inclusion in NLP Datasets 114
4.4 Suggestive Importance of Developing Inclusively Representative NLP Systems among Data Science Teams . . . . . 117
4.5 Whether Demographic Backgrounds of Data Technologists Affect Outcomes of NLP Datasets . . . . . 120
4.6 Feasibility of Involving External Communities as NLP Data Annotators . . . 121
4.7 NLP Practitoners' Familiarity with AI Bill of Rights . . . . . 125
4.8 Presumed Responsibility for Safeguarding Against Adverse AI . . . . . 129

5.1 UW HCDE B-CAB Banner . . . . . 157
5.2 HCDE B-CAB Program Team . . . . . 164
5.3 HCDE B-CAB MOU Cover Page . . . . . 175

6.1 Techno-realist Design Framework . . . . . 191

# List of Tables


Table Number Page

4.1 Roles/Titles of the survey participants. Among participants, the majority have an intermediate level of expertise at 48.94%. Beginners account for 10.64%, Advanced participants represent 25.53%, and Experts make up 14.89% of the surveyed group. . . . . 99

4.2 Race/Ethnicity of the survey participants (n = 47). . . . . 100

4.3 Highest educational degree obtained of the survey participants (n = 47). . . 100

4.4 Profile of focus group participants. . . . . 102

4.5 Example of a specific text or speech NLP-enabled project (technology, feature, tool) that survey respondents have worked on. . . . . 106

# Acknowledgments

My time as a Ph.D. student at the University of Washington has been one of the most rewarding experiences of my life thus far. At the age of 26, I became the first African American man to earn a doctoral degree in Human Centered Design and Engineering. This is a milestone and accomplishment that has not manifested by my doing alone. I owe so much to my Ph.D. co-advisors Julie Kientz and Daniela Rosner for their outstanding support, mentorship, and guidance over the past 4.5 years. You both took a chance by taking me on as your advisee, which I know was not always easy given the broad range of my research interests and advent for involvement that were not always centered in academia. You gave me autonomy to bring my most authentic self to my research and the HCDE community, even when I struggled to find belonging. As mentors you've exhibited what it means to not only support, but also advocate, and most importantly sponsor me as your mentee. I could not have asked for a more dynamic duo of compassionate and stellar scholars to guide me along this journey. In addition, I am grateful to my entire thesis committee, including Alicia Wassink and my GSR Alexes Harris (UW Faculty Regent).

I am forever indebted to the entire HCDE and UW wide communities (2019-2024). The relationships and collaborations I've cultivated with peers in the HCDE CHiLL and TAT Labs and my Fall 2019 Ph.D Cohort that will last a lifetime. There are so many amazing people to acknowledge, but in particular I want to say a huge thanks to: Wendy Roldan, Calvin Liang, Kenya Mejia, Elena Agapie, Dawn Sakaguchi-Tang,

Saba Kawas, Gabrielle Benabdallah, Josephine Hoy, Brian Kinnee, Caitie Lustig, Rebecca Michelson, Meg Moldestad, Burren Peil, Rafael Silva, Blair Subbaraman, Shengzhi Wang, Emma McDonnell, Andrea Figueroa, Anna Beers, John Fowler, Keri Mellari, Meena Muralikumar, Negin Alimohammadi, Neilly Tan, Lotus Zhang, and Elizabeth Dunbar (thank you for being my Ph.D bestie from visit days through graduation. I try don't think I could've gotten through this experience sanely without you! You're such a visionary researcher, empathetic person, and heavy-handed mixologist).

I also can't go without recognizing the diverse group of Black Ph.D. students who I have cultivated deep relationships throughout my tenure. Your friendship and scholarship are so impactful, and I can't believe the community that we've built: Rafael Silva, Akeiylah DeWitt, Leslie Coney, Nathanael Mengist, Jeffrey Basoah, and Adiza Awwal.

I've had the pleasure of learning from some of the most incredible faculty in human centered technology design research and I'm so grateful for those who've stood out as mentors: David Ribes, Tyler Fox, Daniella Kim, Katya Cherukumilli, Sucheta Ghoshal, Beth Kolko, Sean Munson, Nadya Peek, Elin A. Björling, Emily Bender, Chirag Shah, and Jennifer Turns.

I've had had the immense pleasure of serving on the University of Washington Board of Regents as the 24th Student Regent. This opportunity has undoubtedly been the highlight of my graduate student experience at UW and I'm so fortunate to have been entrusted by Governor Jay Inslee to serve in such a capacity. I'm thankful to the entire 2023-2024 UW Board of Regents for their support and guidance: David Zeeck, Leonard Forsman, Leonor R. Fuller, Alexes Harris, Linden Rhoads, Constance W. Rice, Rogelio Riojas, David Schumacher, Blaine Tamaki, Maggie Walker. In addition, I'm proud to have worked alongside university administrators who strive for excellence in our illustrious institution: Ana Mari Cauce (President), Tricia Serio (Provost and Executive Vice President), Timothy H. Dellit (Executive Vice President

for Medical Affairs), Kristin Esterberg (Chancellor of UW Bothell), Sheila Edwards Lange (Chancellor of UW Tacoma), Rickey Hall, Denzil Suite, Mary Gresch, Sarah Norris Hall, Andreas Bohman, Randy Hodgins, Jane Yung, Sally Clark, Ed Taylor, Nancy Allbritton, Karen Thomas-Brown, Joy Williamson-Lott, Frank Hodge, Anind Dey, Tamara F. Lawson, Frank Hodges, Margaret Shepherd, Tyler Lange, Kristin Holmberg-Lennemann.

Thank you to my incredible friends who have all witnessed and supported me along this journey: Jercovie Stewart (my cousin whose always supported me and even followed me to Seattle 3 years ago... I owe you so much and I'm proud of you), Alexia Morton (we've come a long way since 3rd grade bestie), Kyle Walker (my right-hand man, brotha, and future legal counselor), Dennis Parnell (who motivated me to apply to Ph.D programs; I can't wait to celebrate your upcoming Ph.D graduation), Candace Allen (the definition of a phenomenal Black woman who's been in college just as long as I have), Malik Seals (my frat brotha and future research physician) Darious Davis (the clinical health guru and resident ordained minister), Taras Woodson (my bougie childhood friend and soon to be chiropractor), Dr. Marjada Tucker (the Faith MD and my OG big sister/mentor), Rohit Agrawal, Brendan Lucich, Ryan Hurt, Bryan Hurt, Alexzandrea Harris, Dominic Schiano, Jacob Lloyd, Thiale Diop, Henry Iduoze, Christopher Lee, Frankie Johnson, D'Andre Simpson, Aaron Hamlet, Dylan Duru, Christopher Bell, Jasmine Johnson, Kylie Byrd, Kedron Abbott, Alexandra Foote, Cayla Dorsey, Amara Anigbo, Kowe Kadoma, Sydney Nguyen, Christopher Sim, D'andre Garcia-Stubbs, Adinawa Adjagbodjou, Leslie Coney, Jeffrey Basoah, Dru Hill, Salim Mayberry, Aaron Ruffin, Rodney Mosley, Kyle Johnson, Richard Martinez (The Homie), A.I. Akabekwa, Dr. Patrick Pischulti, Dr. Dudley Moore and host of others that I simply don't have room to name. You are all beloved from the bottom of my heart.

Thank you to those researchers whom I have had the pleasure of collaborating

with throughout my Ph.D research: Hannah Wallach, Hal Daumé III, Michael Madio, Su Lin Blodgett, Kayur Patel, Danielle Olsen, Jeffrey Bigham, Courtney Heldreth, Sheena Erete, Emily Denton, Lauren Wilcox, Eric Corbett, Christina Harrington, Alex Taylor, Ben Shapiro, James Fogarty, Martez Mott, Denae Ford-Robinson, Lauren Thomas Quigley, India Irish, Ihudiya Finda Williams, and Chris Crawford (my undergraduate research advisor (University of Alabama) who got me started with HCI research).

I'm also extremely grateful to the HCDE Department Staff who make everything happen behind the scenes to keep our department productive, happy, and impactful! Thank you for fulfilling my many requests over these past years: Kathleen Rascon, Alex Llapitan, Melissa Ewing, Leah Pistorius, Summer Dela Cruz Parkes, Stacia Green, Jane I. Skau, Alanna R. Daniels, Katia Jossa-Jouable, Laura Davis, Allen Lee, Caitlin Christian, Liz Young.

None of this would've been possible without the support of my family and communities. I am beyond grateful for my parents Steven Little and Tomica Denise Cunningham Hayes for your love, encouragement, and prayers - this one is for you, and I owe you everything! My sisters Skylar Hayes and Jada Spann - I love you with every fiber of my being and I'm so proud of the incredible women that you continue to be. My darling niece Kenslei Noelle - we've set the bar high, and you will surely exceed it. My grandparents: Peter and Linda King, Sally and June Elston, Nancy Mae Cunningham, the late Johnny Lockett - this achievement is now a part of our family's legacy. I hope I've made you proud - with all my love.

Thank you to the institutions that have educated me throughout my life thus far: Lowndes County School District (West Lowndes High School), East Mississippi Community College (A.A.), The University of Alabama (B.S.), University of Washington (M.S., Ph.D.). You have collectively prepared me to face the world and my career with all the force.

I am extremely grateful for the agencies who have supported my doctoral research and education: the National Science Foundation Graduate Research Fellowship (NSF-GRFP), the Gates Millennium Scholars Program (GMSP-UNCF), the National GEM Consortium Ph.D. Engineering and Science Fellowship (GEM), the Google Award for Inclusion Research (AIR), the University of Washington Black Opportunity Fund (BOF), the Social Science Research Council Just Tech Fellowship (special shout-out to the 2023-2025 cohort - you're all so inspiring), and the University of Washington Bonderman Travel Abroad Fellowship.

Anything is possible when we not only have faith, but also put in work, as Habakkuk 2:2 reminds us: "Write the vision and make it plain on tablets so that anyone can read it quickly."

To Yahweh be the Glory – forever and ever!

# Dedication

*Queues "On My Mama" by Victoria Monet.*

**I put this on my mama, on my hood...**

This dissertation is dedicated to the UNDERDOGS:

small town folks (shout out to Artesia, Mississippi), those from historically underrepresented Black American communities, and any marginalized person whose ever dared to dream big!

I hope my journey is simply a testament to how great life is when you bet on yourself.

# Chapter 1

# Introduction

> "We must rapidly begin the shift from a "thing-oriented" society to a **"person-oriented"** society. When machines and computers, profit motives and property rights are considered more important than people, the giant triplets of racism, materialism, and militarism are incapable of being conquered."
>
> - Rev. Dr. Martin Luther King, Jr. (1967)

These powerful words from Dr. Martin Luther King, Jr., spoken over half a century ago, ring with a prescient urgency in the age of artificial intelligence (AI). As AI technologies permeate every aspect of our lives, from financial transactions to communication, the imperative to center human needs and social justice in their design becomes paramount. My dissertation, "Methods of Designing Justice-Oriented Interactive AI Systems," grapples with this challenge, focusing on the intersection of AI and racial equity, particularly within the African American community. My research is driven by a deep commitment to responsible AI and the belief that technology should be a tool for liberation, not oppression.

## 1.1 Research Motivation and Context

The increasing emphasis on responsibility within AI systems and user experiences in the technology sector necessitates the adoption of new practices and adaptations by a diverse range of practitioners, many of whom occupy informal positions and prioritize human-centered aspects of AI. The rapid development of interactive AI systems, including digital banking and natural language technologies, presents significant potential to enhance human collaboration, communication, and information access. However, the innovation within AI systems often fails to address the specific needs and experiences of marginalized communities, which raises concerns about the inclusivity of these advancements.

The term "design" within this context is specifically applied to technological applications. A "designer" is thus defined as an individual who guides the production of a system through various processes, which may include technical innovation ideation, program management, research science, algorithm development, or software interaction/interface design. This dissertation is driven by a concern that I share with many others in the field: that tools intended to empower users may inadvertently perpetuate existing social inequalities, reflect and amplify societal biases, and negatively affect communities historically situated on the margins. To explore this issue, the research focuses on the impact of these technologies on African American communities, with the broader goal of identifying strategies to make AI development more inclusive and equitable.

## 1.2 A Personal Journey Towards Justice-Oriented Design

As an AI & society researcher with a strong commitment to responsible AI and racial equity, my work is driven by the conviction that technology should serve as a bridge, not a barrier, for minority communities. I am particularly focused on the experiences of African Americans

in Seattle, aiming to illuminate the nuanced ways in which they interact with AI systems. This research is rooted in the understanding that these communities possess rich cultural assets and capacities that are too often overlooked or undervalued in traditional technology design processes.

My journey toward this research is deeply grounded in my personal and professional commitment to community building and social justice. Through years of civic engagement, sustained dialogue, and public interest technology work, I have witnessed first-hand the desire of underserved communities to be active participants in technological innovation. However, I have also observed a persistent disconnect in how these communities are engaged, with traditional research and development processes often failing to meaningfully involve those most affected by the technologies being created.

My experience contributing to research at Google underscored the potential for equitable collaborations between tech firms and nonprofit community-based organizations (CBOs). However, it also highlighted the unique challenges and opportunities present in partnerships initiated by academic institutions. Recognizing the distinct roles and motivations of different stakeholders, I have sought to understand how collaborative models can be tailored to empower local CBOs, particularly those serving underrepresented communities, to have a meaningful voice in shaping the technological landscape.

## 1.3 Who is the Black Tech User?

This dissertation concerns itself with the experiences and perspectives of Black or African Americans. There are two initial points to make about this population of interest and their relation to the problems identified and discussed in this research. The first is that it is necessary to be mindful of the degree to which experiences of Black users of various

technologies can and cannot be generalized to other racially and ethnically minoritized[1] communities. Although the challenges and imbalances produced by underrepresentation of a given population in the design process are likely mirrored in other community contexts, this is ultimately a study of the Black experience with technology, and neither "Black" nor "African American" should be understood as interchangeable with "minority" or some generic "diverse community" – as this work shows, there is a great need in HCI to emphasize cultural specificity in opposition to broad generalization.

Hence, the second point of clarification is who is identified by the term "Black", or the often interchangeable term "African American". Truly, these terms are amorphous and temporally fluid, and who identifies with them or is identified by them may vary from individual to individual, from community to community, and certainly decade by decade. This dissertation does not make any deontic or normative claim as to how these terms should be wielded, especially because of a recognition that discrete or essentialist definitions of human groups – by genetics, physical attributes, political interaction, cultural traits, or language – is empirically deficient and politically inflammatory. Rather, of interest in a question of the application of the terms "Black" and "African American" is a distinction between a very broad racial grouping that might include all peoples descended from Sub-Saharan Africa and a cultural group defined by the lineage of enslaved Africans in the United States. Of course, as race is a social construct that creates cultural communities, there are no clear lines between these potential categories. For the purposes of this dissertation, I use "Black" when referring to a broad racial grouping that could include Black peoples from the whole of Black African or the African Diaspora, whereas "African American" is a term reserved for the cultural group defined by the heritage of Black peoples in the United States. Racialization produces a cultural context wherein most Black communities or individuals in

[1]The U.S. Department of Health and Human Services Office of Minority Health defines racial and ethnic minority populations among the following demographics: Black/African American, American Indian and Alaska Native, Asian American, Hispanic/Latino, Native Hawaiian and Pacific Islander (https://minorityhealth.hhs.gov/minority-population-profiles). Accessed July 2024.

the United States become culturally integrated to African American culture, even if they are more recent immigrants from Africa or non-US diaspora communities, but there are Black immigrant communities that retain a degree of isolation from broader African American culture, and thus even in the US context, we should be careful not to conflate race and culture. We thus recognize that – by the terminological ontology used for this dissertation – some Black communities or individuals in the United States are not culturally African American.

## 1.4 Dissertation Overview

In pursuit of these objectives within the content of my dissertation, I describe and extrapolate from three investigations. I begin in Chapters 3 and 4 by presenting and expanding on two studies that examine the socio-technical experiences relevant to African American users within interactive AI systems for banking applications and natural language technologies. I engage in a reflective analysis across these works that traverses methods from interviewing, to focus groups, and ends with the advent of community-engaged technology design. Through these studies, I shed light on the ways in which African American communities' cultural assets and capacities can serve as strengths and appropriate sites to design toward within technology innovation, speculating on research methods for doing so. I then present a study that considers a methodological approach for accountable community-based collaboration in technology research and design processes, which prioritizes community knowledge and participation among African American community members. I reflect on my experience by examining how design-based engagements might support minority groups' agency in collaboratively envisioning and designing a more just and socially beneficial technological reality. This aims to facilitate greater accountability, participation, and power redistribution in technology design, ultimately contributing to more equitable and socially responsible AI solutions that authentically represent – and do some justice for – underrepresented minority

communities.

## 1.5 Dissertation Thesis Statement

### 1.5.1 This dissertation can be summarized in the following claims:

**Claim 1** Interactive AI systems –particularly digital banking and automated speech recognition (ASR) present important challenges and benefits for African Americans who experience them from a culturally relative perspective.

**Claim 2** While human-centered AI researchers and technologists have an extensive toolbox of methods, traditional methods may have limitations and may need adaptation or new methods to foster accountability within technology research and design processes for African Americans. One way to explore this is through instituting a community advisory board (CAB) among Black community-based organizations, prioritizing long-term collaborative partnerships and equitable outcomes.

### 1.5.2 Position Statement on Accountability in AI System Design

As a technologist committed to fostering design justice in interactive AI systems, I embrace a framework of accountability inspired by the epistemology of feminist scholars Donna Haraway [1], Lucy Suchman[2], Jihan Sherman [3] and Patricia Hill Collins [4]. Central to my thesis is the assertion that traditional participatory methods, while essential, often fail to achieve the level of full accountability necessary to ensure culturally relevant and socially beneficial user experiences. In situating my positionality [5], I outline my perspective of practicing accountability in HCD, integrating Haraway's concept of situated knowledge, Suchman's notion of located accountabilities, and Hill-Collins's framing of Black feminist thought in the production of technology. I doing so, I join the ranks of Black male feminist

scholars, including Frederick Douglas, W.E.B. DuBois, and Andre Brock [6], in undertaking intersectional feminist thought and elevating such epistemology in male-saturated technical disciplines.

**Situated Participation** Recognizing Partial Perspectives In alignment with Haraway's critique of the "god trick" and her advocacy for situated knowledge [1], I recognize that all participants in the design process bring their own limited, situated perspectives. This understanding counters the illusion of an all-encompassing, objective view and highlights the importance of acknowledging these partial perspectives in the design of AI systems.

**Encouraging Diverse Inputs** To achieve a truly inclusive design process, it is crucial to actively seek out and integrate diverse perspectives from various stakeholders, ensuring that these perspectives are not marginalized. This involves engaging with a wide range of communities, especially those of Black Americans [4], who've been historically underrepresented in technology development.

**Inclusive Decision-Making:** Traditional participatory methods often fall short of genuine democratic participation. I advocate for moving beyond tokenism involvement to establish processes that genuinely include all stakeholders in decision-making. This means creating spaces where every voice can be heard and valued.

**Empowering Marginalized Voices:** A key aspect of democratic participation is the empowerment of marginalized communities. Ensuring these communities have a real say in the design and implementation of AI systems addresses power imbalances and fosters more equitable outcomes.

**Collective Knowledge and Responsibility** Collaborative Networks Building on Suchman's emphasis on located accountability[2], it is essential to map and understand the net-

works involved in technology production and use. This includes identifying how different actors contribute to these processes and fostering collaboration among them.

**Shared Accountability** Accountability should be viewed as a collective effort. By fostering a sense of shared responsibility among all participants, we can ensure that accountability is embedded throughout the design and implementation processes.

**Transparency and Reflexivity** Transparent Processes: Transparency in design processes is critical to accountability. By making these processes visible, stakeholders can better understand the steps involved in technology production and hold designers accountable for their decisions.

**Reflexive Practices** Encouraging reflexivity among designers and technologists prompts continuous questioning and assessment of their roles and responsibilities. This practice helps in identifying and mitigating potential biases and ethical concerns.

By integrating Haraway's concept of situated knowledge [7] and Suchman's located accountability [2], I aim to ensure that the design of AI systems is both culturally relevant and socially beneficial. Embracing partial perspectives, fostering democratic participation, encouraging collective knowledge and responsibility, and maintaining transparency and reflexivity are essential steps in achieving this goal. Through these efforts, we can overcome the limitations of traditional participatory methods and move towards a more just and accountable approach to AI system design.

This position statement underscores my commitment to these principles and serves as a guiding framework for my work in developing AI systems that prioritize accountability and design justice.

## 1.6 Dissertation Thesis Research Questions

**RQ1:** What are the experiences of African American users of interactive banking and automated speech recognition (ASR) AI systems? How are they being affected by them, as well as related challenges, benefits, and opportunities?

**RQ2:** What aspects of traditional human-centered design methods work well for helping researchers more responsibly understand and engage the needs of African Americans using interactive AI systems, and what are ways those methods need to evolve?

**RQ3:** How might Black community-based advisory boards be responsibly established in university technology research and design organizations? What are the perceived benefits and advantages to community members and technologists?

## 1.7 Dissertation Chapters

My dissertation chapters are presented as follows:

- Chapter 1: Introduction and Motivation
- Chapter 2: Literature Review of Theory and Methods
- Chapter 3: Exploring Black User Experiences and Needs with Digital Banking Services and Financial Applications
- Chapter 4: Advancing Data Equity - Responsibility and Representation in NLP Data Practices
- Chapter 5: Co-Development of Socially Responsible Research Goals and Outcomes through Black Community Advisory: A Reflective Narrative Essay

- Chapter 6: Discussion and Conclusion: Toward a Techno-Realist Innovation Framework

# Chapter 2

# Theory and Literature Review

This work is theoretically grounded in four primary discourses:

- Human-centered technology design
- Racial inclusion and fairness in AI and HCI
- Critical race theory in the context of computing
- Participatory community-based design

Utilizing these theoretical perspectives has allowed me to consider the uneven distribution of experiences and outcomes with AI systems for historically marginalized communities of users, the ways in which people and communities navigate technologies through the unique lens of their lived experiences, identities, and values, and the opportunities to leverage equitable and inclusive approaches to community-based collaboration for developing a more justice-oriented technological landscape. In this chapter, I present a literature review of the discourses this work engages with and contributes to. I first outline traditions of human-centered design research for AI systems, then I describe and contextualize contemporary issues of racial inclusion and fairness in AI and HCI, with a specific focus on Digital Banking

Services, Financial Technology, Automated Speech Recognition, and Natural Language Processing. Then, I will discuss theories of critical race, values sensitive design, and cultural relativity. Finally, I will draw concepts of design justice and accountability in AI development, expanding on notions of collaborative-participatory and community-based approaches...

In this chapter, I also summarize related research in three major fields related to justice-oriented AI design: human-computer interaction (HCI), human-centered design (HCD), artificial intelligence and machine learning (AI/ML).

## 2.1 Traditions of Human Centered AI Design Research

**History of Perspectives on AI:** Over the past 80 years, artificial intelligence (AI) systems, including machine learning, natural language processing, and mixed reality, have revolutionized how people and industries connect, communicate, and work. Since Alan Turing's (1950) groundbreaking proposal of the "Turing Test"[8] to assess machine intelligence in exhibiting human behavior, two philosophical perspectives of AI have emerged: rationalistic and design-oriented.

- Rationalistic Perspective (Technological): This view focuses on the theory and development of AI systems that replicate human abilities and perform tasks requiring human intelligence. It prioritizes mathematical and technological advancements [9].

- Design Perspective (Humanistic): This perspective considers AI as a tool to enhance human capabilities and improve human conditions. It emphasizes the interaction and involvement of humans with computers, accounting for human thought and physical embodiment [10].

The ongoing discourse between these perspectives shapes how we consider the interaction between humans and computers.

**Human-Computer Interaction (HCI) and Design Research** The field of human-computer interaction (HCI) and design emerged as a discipline where researchers and designers pursue technological advancements that bridges the gap between technology and human needs, focusing on usability, accessibility, and overall user experience (UX). Human-centered design (HCD) plays a pivotal role in shaping AI technology that prioritizes human well-being. HCD research encompasses various approaches that center people in the design process, considering their needs, motivations, emotions, behavior, and perspectives. As AI continues to advance, more grounded and contextual considerations on social impact of AI on indexed groups of people have become paramount. The rationalistic and humanistic perspectives approach these questions differently:

- Technological Rationalistic: Focuses on developing normative models and technical principles to guide AI development ethically.

- Humanistic Design: Examines the implications of AI in human and social situations, using empirical knowledge to inform system integration.

Both perspectives underscore the need for "human-centered AI," emphasizing ethical and trustworthy development.

**Moving Forward with the Humanistic Design Perspective** The humanistic design perspective offers a valuable lens for examining the societal impact of AI. This is the position and perspective I take up across this dissertation article. It uses human-centered design research methods to investigate the ethical and moral dilemmas that emerge in human-AI interactions. For example, Wizard-of-Oz prototyping has been employed to better understand user needs in machine learning [**?** 11]. This human-centered lens as a technology innovation perspective recognizes that universal design principles cannot address context-specific ethical questions and that technical robustness alone does not prevent unintended consequences. When addressing social justice issues in human-computer interaction, such as

racial or socioeconomic bias, the methods for designing AI systems must be justice-oriented [12; 13; 14]. Community-based systems design (CBSD) is an example of a HCD method that has been applied to address issues of bias in healthcare risk-assessment AI for Black American patients[15; 16]. Ultimately, The humanistic approach emphasizes that responsible AI design goes beyond simply considering vague user personas to map technical requirements, but toward realizing human needs and social factors of technology advancement. It requires emerging frameworks that prioritize social good and advance inclusion and equity to promote that AI systems are designed to benefit all members of society. By integrating diverse perspectives and prioritizing human values, human-centered AI can pave the way for a future where AI serves as a powerful design tool for positive social change.

## 2.2 Racial Inclusion and Fairness in Artificial Intelligence and Human-Computer Interaction

Across the landscape of socio-technical scholarship within the fields of artificial intelligence (AI) and machine learning (ML), and human-computer interaction and design (HCI+D) research has turned attention to the implications of users' racial and ethnic identities on the feasibility and availability of interactive automated systems. The emergence of these claims have been specific in relation to the design of AI systems and the user experiences and impacts of interactions among racial and ethnic minority groups who have been historically marginalized in the United States (U.S.). In particular, there has been a growing body of work that highlights the harmful impacts of biased, discriminatory, and oppressive AI systems on Black and African American people, exposing the racializing effects of technology development more broadly [17; 18; 13; 19; 20]. For example, facial/skin recognition algorithms that discriminate against darker complexions and skin-tones [21]; predictive policing and prison recidivism AI that disproportionately disadvantages Black men [22]; financial

lending algorithms that denies Black loan seekers distinctly more than White applicants [23]; and commercial automated speech recognition systems that fail to capture African American English [24; 25; 26]. These AI systems and digital devices fail to meet the needs of Black and further positions Blackness as a key site through which surveillance and discrimination is practiced, thus inviting those who steward such data-centric systems to consider the ways in which AI is designed, whose and what data is being used, and how might AI be developed through practices that are responsible and reduces harm?

HCI scholars [27] argued that algorithmic fairness researchers "need to take into account the multidimensionality of race, take seriously the processes of conceptualizing and operationalizing race, focus on social processes which produce racial inequality, and consider perspectives of those most affected by sociotechnical systems." They further observe that current methodologies of addressing algorithmic fairness fail to adequately account for the socially constructed nature of race, instead adopting a conceptualization of race as a fixed attribute. Similarly, Ogbonnaya and Ogburu [28] argued that "racism is pervasive in everyday socio-technical systems; that the HCI community is prone to 'interest convergence,' where concessions to inclusion require benefits to those in power; and that the neoliberal underpinnings of the technology industry itself propagate racism." These scholars lay a theoretical basis for race-conscious efforts and responsibility in HCI, urging that as a community and research field, practitioners must be attuned to issues of race; actively seeking to engage with perspectives of underrepresented minorities across various works [28]. Published in 2020, this work is admirable and timely given the current social climate in the U.S., but the truth is that the basis of this claim has been long overdue within the HCI and AI communities.

### 2.2.1 Fairness and Inclusion in Digital Banking Services and Financial Technology

Within the context of interactive AI systems, digital banking services and related financial technologies service to automate financial activities and scale economic mobility for consumers. In understanding the challenges and benefits for African American users, a large interdisciplinary body of literature informs an analysis of race and exclusionary banking, and engineered financial inequality, and opportunities for financial service technology. Urban scholars have mapped substantial and longstanding limits to Black Americans' access to bank branches [29; 30]. Economists have pointed to the wealth gaps perpetuated by low expectations for mutual financial support [31].Highlighting the prevalence of community financial networks amid institutional distrust, scholars have also found the predominance of high-cost and predatory financial and lending programs in place of mainstream services [32; 33; 34]. Existing finance and economic research that support the notion that Black people are discriminated against in banking, offering critiques of perceptive credit-worthiness [35], racial bias in Black business credit scoring [36], and automated decision making in small business lending [37]. Conditional aspects like treatment while attempting to borrow, access to credit and capital, repayment ability, and even skepticism around whether to apply for loans in fear of denial [36]; all are grounded-truths of how minority groups have had to navigate and preserve American economics in the face of systemic inequities. Even in cases where it may be suggested that automated decision making can reduce racial bias and discrimination in financial services [37], this still negates the power and responsibility that technologists have to counteract such disparities socially and systemically to endow longer-lasting social change for Black communities in finance through digital banking services and financial technology.

Despite the shifting role of digital services in these practices, research on Black financial inclusion and informality has only begun to examine the impacts of financial technology. As

digital banking services become more standard across the landscape of financial AI systems, scholars are recognizing the implications of historical and continued discriminatory financial practices, while amplifying the ways in which marginalized and disadvantaged communities persevere to participate in an economy that was never designed for their success [29; 38]. Over the past three decades, design and HCI literature has increasingly considered the relationship between financial services and digital developments. To date, this work has focused on a range of platform issues, including dynamics of distributed ledger technologies like blockchain and digital-born currency like bitcoin and crypto-currency [39]; the evolving character of algorithmic explainability [40]; privacy and trustworthiness in banking AI [41]. Scholars reveal the strong role that digital banking AI and financial technology play in reproducing patterns of exclusion and control. The promise of increased financial autonomy through digital services places the burden on the most vulnerable users. While this work has highlighted forms of techno-capitalism that harmfully shape people's everyday experiences, it often leaves the vital issue of race and racial capitalism under-explored [42]. HCI research into Black communities and digital banking platforms such as Venmo and Cash App suggests that factors like cultural attunement, relativity, and social influence play a significant role in the adoption of mobile apps among underbanked African Americans [43; 44]. The emergence of digital banking applications that have been designed to honor identity and culture, presents opportunities for interactive AI systems that are more racially inclusive and provide fair quality of service to underserved Black users.

### 2.2.2 Bias and Fairness in Natural Language Technologies

Collectively, scholars, technologists, and designers alike seek to address design, development, and deployment of intelligent machines and their impacts on minority, marginalized, and vulnerable communities [45; 46; 47]. More specifically, machine learning researchers have been concerned with the impacts of natural language processing (NLP) reliant technologies on historically oppressed minorities and language groups [24]. Notably the accuracy of

automated speech recognition (ASR) systems has come into question as this technology is employed in a number of IoT (Internet of things) devices and applications [25]. From virtual assistants integrated into mobile devices (e.g. Apple's Siri), home assistants (e.g. Google's Nest; Amazon's Alexa Echo), and vehicles (e.g. Apple's CarPlay; Android Auto); to software tasks such as automatic translation, automatic captioning, automatic subtitling and even hands-free computing, these technologies are becoming more ubiquitous in the lives of people as innovation rapidly grows [25].

The usability of these systems is heavily reliant upon complex machine learning (ML) models trained on various dynamic text and speech datasets [48]. These datasets often are produced through autonomous unsupervised modeling or supervised modeling, where humans-in-the-loop annotate or label data to accurately define model tasks and behaviors. This in turn highly influences how intelligent and what capabilities features like ASR are equipped for, which can often present performance gaps. And this point introduces issues of equity and fairness of ASR language technologies among communities of linguistic and ethnic minority American English speakers. Large language models (LLM) are often trained on datasets of White Mainstream English (WME) which is the dominant variety of English in the United States [49]. The assertion that WME is predominant in the US is a descriptive, not prescriptive, claim by linguists and language researchers [50], yet it further perpetuates the notion that the "standard" equates to white, cis-normative, and socially acceptable. In addition, this practice perpetuates harmful linguistic ideologies, which often denigrate, reject, or discredit other minoritized varieties of spoken and even written English [51]. And despite their legacy in shaping American culture, historical language varieties that are typically associated with by race/ethnic groups such as African-American English (AAE) are often denigrated as ungrammatical and linguistically less than other forms of American speech [52].

Decades of research in psychology and linguistics have shown prejudicial attitudes towards a given social group can impact perceptions of comprehensibility and credibility, further

perpetuating damaging social stigmas in legal, workplace, educational, and social settings [51; 53]. Such a phenomenon isn't exclusive to speech communities using non-standard varieties of English, but also presents challenges to those who are non-native English speakers or those with speech impediments and disabilities (The Accent Gap, n.d.). Interactive AI systems capable of automated speech recognition often rely on ML models and training data based on WME [54]. Reliance on data from an over-represented majority means that the sociocultural data, experiences, and stories of underrepresented minorities are not being included in the design and development of these systems. Thus, these conventions in NLP data modeling often result in limited, unexpected, or even denied user experience among these communities [55] As sociologist and critical race scholar Ruha Benjamin asserts, these experiences are those forced upon by what she describes as faucets of "engineered inequality" and "default discrimination", both dimensions of what she so appropriately coins as "The New Jim-Code": the employment of new technologies that reflect and reproduce existing inequalities, but are promoted and perceived as more objective, scientific, or progressive, than the discriminatory system of the previous era" [17]. When this critical lens is applied to the user experience of language technologies, scholars and designers of ASR and other NLP systems should interrogate the impacts of use in such contexts against the backdrop of colonial impulse and design. The explicit codification of racial stereotypes, ethnic and cultural erasure, and even ableism bias in computer systems are surely forms of discriminatory design [17].

One example of implicit data bias comes from the experience of data scientist Rachel Tatman, who after conducting a study of Effects of Talker Dialect, Gender& Race on Accuracy of Bing Speech and YouTube Automatic Captions, asserted, "These systems are going to work best for white, highly educated, upper-middle-class Americans, probably from the West Coast, because that's the group that's had access to the technology from the very beginning" [56]. This comes after her findings suggested that higher word-error rates (WER) among non-white talkers was worrying, as it may reduce the utility of these systems for talkers of color [49]. These studies provide additional evidence that, despite dramatic improvements

in NLP, ASR continues to struggle to maintain high accuracy in the face of well-documented non-standard varieties, like African American English [57; 25; 49]. And if scholars are to suggest that Black speakers are not as able to take advantage of these technologies as other racial groups, then interrogating practices for ASR development, along with examining the intended and unintended consequences of them becomes a more critical endeavor [58]. This means to evaluate aspects in which the very basis of development requires such as: Whose data is being used to inform NLP? Whose literal voices and data are missing? And what social biases might systems be replicating? Furthermore, studies refrain from interrogating the very basis of their core inquiries: the experiences of the users, be it individuals or Black communities broadly. And as [59] asserts, human-centered AI and NLP researchers must go beyond evaluation measures, word definitions and word order to assess AAE on a granular-level to better understand context, culture and word ambiguities to ensure fairness in NLP tools.

In my research, I came to understand that ML technologists have suggested and highly relied on quantitative approaches toward addressing bias and fairness in training models and datasets including: better data collection of data on other non-standard varieties of English [25], including regional and non-native English accents (Koenecke et al., 2020), further accent adaptation for large-scale commercial systems [56], and leveraging online libraries and databases to diversify data [60]. But even when employing these techniques, outcomes are not necessarily beneficial to those impacted. As an HCI researcher, I find myself most interested in the experiences of users within intelligent systems. Throughout much of ML works, there exists a lack of users' voices, context around their lived experiences, and provocation of how engaging affected communities may vividly humanize the impacts of biased technologies. Kapania et al. 2023 [61] argue that operational barriers and the widespread resistance to accommodating diversity in data practices surface a common narrative "where neutrality, objectivity and 'representationalist thinking' dominate" as 'grounded-truth' within data works, affirming and standardizing conceptual frameworks for what knowledge or informa-

tion is valuable truth. Here is where I found my highest area of interest and potential for impact.

## 2.3 Theorizing Assets of Race, Human Values, and Culture in Socio-Technical System Design

Coined by Kimberlé Williams Crenshaw, a law professor at the U.C.L.A. School of Law and Columbia Law School, Critical Race Theory (CRT) is a theoretical and interpretive mode that examines the appearance of race and racism across dominant cultural modes of expression [62]. Presented as a graduate level academic framework, CRT does not define racism in the traditional manner as solely the prejudices of individuals and the bad acts they perpetrate as a result of prejudice; rather, racism is defined as the unintended (but often foreseeable) consequence of choices made in a system where individual prejudices are common. This perspective, which originally focused on the embedding of prejudicial attitudes in seemingly "color-blind" laws, is the basis for understanding what is often termed "systemic" or "institutional" racism, in contrast to the explicitly biased views of individual persons. CRT exposes the ways that racism is often cloaked in the terminology of "mainstream," "normal," or "traditional" values or "neutral" policies, principles, or practices [63]. In adopting this approach, CRT scholars attempt to understand how victims of systemic racism are affected by enculturated perceptions of race and how they can represent themselves to counter prejudice [64; 65].

Intertwined with critical movements in philosophy, history, and sociology, CRT has its origins in critical legal studies, which aimed to understand the relationship between codified written law and the wider social order and cultural biases that law is written in the context of. Within critical legal studies, CRT was influenced by race/ethnic scholarship tracing racism in America through the nation's legacy of slavery, the Civil Rights Movement, and ongoing

processes which disenfranchise racial minorities. In doing so, it draws from work by writers like Sojourner Truth, Frederick Douglass, W.E.B. Du Bois, Martin Luther King, Jr., and others studying law, feminism, and post-structuralism. CRT developed into its current form during the mid-1970s with scholars like Derrick Bell, Alan Freeman, and Richard Delgado, who responded to what they identified as dangerously slow progress following Civil Rights in the 1960s, which they attributed to implicit racial and cultural biases being encoded in law despite the explicit attempt to create a race-blind legal system. The field continued to grow through the 1980s and 1990s, and the analysis of implicit bias has since developed as a field of inquiry not only in the legal studies, but other areas of scholarship such as education, public health, and technology.

There have been a number of interpretations of how people should understand and operationalize CRT. A central theme is that the theory rejects the philosophy of "color-blindness," acknowledging that disproportionate racial disparities have persisted in the United States despite decades of civil rights reform, raising structural inquiries about how racist hierarchies are enforced [66]. While recognizing the evolving and malleable nature of CRT, Bridges [67] outlines a few key tenets of CRT which would inform any race-critical practice, including:

- Recognition that racial categories are not biologically real, but that race is socially constructed and socially significant. It recognizes that science (as demonstrated in the Human Genome Project) refutes the idea of biological racial differences. According to scholars Richard Delgado and Jean Stefancic, race is the product of social thought and is not connected to biological reality.

- Acknowledgement that racism is a normal feature of society and is embedded within systems and institutions, like the legal system, that replicate racial inequality. This dismisses the idea that racist incidents are aberrations but instead are manifestations of structural and systemic racism.

- Rejection of popular understandings about racism, such as arguments that confine racism to a few "bad apples." CRT recognizes that racism is codified in law, embedded in structures, and woven into public policy. CRT rejects claims of meritocracy or "colorblindness." CRT recognizes that it is the systemic nature of racism that bears primary responsibility for reproducing racial inequality.

- Recognition of the relevance of people's everyday lives to scholarship. This includes embracing the lived experiences of people of color, including those preserved through storytelling, and rejecting deficit-informed research that excludes the epistemologies of people of color.

CRT scholars emphasize its relevance in recognizing and understanding institutional structures. Yosso [68] argues that CRT can be utilized to theorize, examine, and challenge the implicit and explicit impacts of race and racism on social structures, practices, and discourses, noting that scholarship ignoring race upholds the existing racial hierarchy. Crenshaw [62] views CRT as an active process, emphasizing its role in analyzing how race is produced, how racial inequality is facilitated, and how historical inequalities are perpetuated unless addressed. Matsuda [69] adds that CRT takes the lived experience of racism seriously, using history and social reality to explain racism's operation in American law and culture, aiming to eliminate its harmful effects and create a just and healthy world for all. Therefore, in any domain in which a critical analysis of race might be applied, CRT scholars have emphasized the necessity to embed social structures and processes within the larger historical dynamics that may reproduce racially disparate outcomes regardless of whether there is individual or institutional intent to do so.

Thus, the examination of racial recognition in algorithmic, technical, and design research must also include the notable contributions of scholars who focus on the absurdity of solving issues like anti-blackness with technological devices, many of which reproduce the same social inequalities which they claim to alleviate [70; 71; 72]. To date, we've increasingly seen the

growing contributions among interdisciplinary Critical Race, Culture and Technology Studies (STS) scholars highlighting the ways in which these technologies can negatively impact people of color and other under-represented cultural groups. Scholars like Ruha Benjamin [17], Safiya Noble [73], Jessie Daniels [74], Lisa Nakamura [75], Simone Browne [76], Wendy Chun [77], and Virginia Eubanks [71] and so many others characterize a technology design space perpetuating such harms by proposing over-reaching, under-performing, and paradoxically problem-making solutions [78]. These works are all influenced by tenets of CRT and together underscore the importance of truly understanding the complex social identities of people and how these classifications speak to greater agency of historically marginalized groups. Identities should be viewed as strengths of the beholder, not as deficiencies used to devalue the capacity of a group or community. An assets-based perspective could be a compelling site of intervention when matched with tenets of CRT to further operationalize intersectionality in the design of interactive AI and digital systems.

## 2.4 Designing Toward Community Culture and Assets

A growing body of work in HCI, AI and design research builds upon asset-based approaches found in community health and development scholarship, centering marginalized users' cultural capacities for driving change. Wong et al. [79] demonstrated that cultural sociologist Ann Swidler's theory of culture-in-action [80] was a productive lens for analyzing situated capacities in capacity-focused design. This theory proposes that culture shapes the capacities people use to act in the world. Swidler [80] argued that culture is a toolkit of public symbols and social practices that allow individuals to develop capacities for constructing habitual ways of acting or strategies of action (problem-solving skills). Culture is complemented by structural barriers and limitations, but understanding how individuals (or groups) navigate them is a great site for unpacking racial/ethnic capacities and situated use of cultural innovations. These capacities can be expanded as what sociologist Pierre Bourdieu (1986) calls

'cultural capital,' which can manifest in three different forms: "in the embodied state, i.e., in the form of long-lasting dispositions of the mind and body; in the objectified state, in the form of cultural goods (pictures, books, dictionaries, instruments, machines, etc.), and in the institutionalized state, a form of objectification which can be seen in the case of educational qualifications and skills [81]. Bourdieu argues that it is in fact impossible to account for the structure and functioning of the social world unless one reintroduces capital in all its forms and not solely in the one form recognized by economic theory [81].

When assessing the framings for Swidler's [80] Theory of Culture in Action and Bourdieu's [81] Theory of Cultural Capacities, a number of principles are standard:

- Understanding how individuals creatively use culture to solve problems without denying structural limitations.

- Culture as a toolkit of resources (symbols, stories, rituals) cultivate skills, habits, styles of an individual.

- Individuals draw resources to assemble persistent strategies of action for routinely attaining their goals.

While technology design processes for an array of applications support users in navigating their challenges, they often conceptualize findings and users' needs as if they were deficiencies that only new innovations could fix. Scholars like Wong et al. [79] have focused on community-based developments, culminating in design guidelines, online resources, and workshops that facilitate a myriad of financial, social, and communicative tasks, interweaving intersectional use and thinking: Asset Based Design. Progressively, this approach centers the design process on identifying individuals' and communities' strengths and capacities (both in/tangible), exploring feasible and truly user-centered pathways for users to build on surfaced assets to achieve desired and sustainable change [79]. HCI has prioritized discussions on how design could work towards social change in, through, and beyond technical systems

for the tensions of equity and justice they present [78; 12]. In particular, research has shed light on the adequacy of methods used for understanding vulnerable populations, the design practice within cultural encounters, and design approaches for incorporating the knowledge of vulnerable communities. All the while progressive, HCI still falls short of ensuring that technology-enhanced interventions produce a long-term, sustained outcome, especially in resource-constrained context" [79; 82; 83]. Seemingly, the stakes of certain types of interactive AI systems such as digital banking services or automated speech recognition, presents consequences that are distributed and manifested in various forms by different racial/ethnic and cultural groups of people [84].

### 2.4.1 Values Sensitive Design

Values Sensitive Design (VSD) is an approach that systematically and comprehensively integrates human values into the design of technology. Introduced by Batya Friedman in the mid-1990s, VSD has since evolved to address the complexities of modern technological advancements, particularly in Human-Computer Interaction (HCI) and Artificial Intelligence (AI) [85; 86]. VSD is both a theoretical and methodological innovation that aims to foreground ethical considerations within design processes. The core of VSD lies in its tripartite methodology, which involves conceptual, empirical, and technical investigations to ensure that end products align with human values such as privacy, fairness, and accountability [86].

The application of VSD in HCI and AI has been notably influenced by Friedman's work, which advocates for the proactive inclusion of ethical considerations in design practices. This is crucial in AI development, where ethical missteps can have significant repercussions [87]. In the realm of AI, VSD has been used to work toward beneficial outcomes by embedding common values identified among diverse stakeholder groups. This approach ensures that AI systems do not merely operate technically but also adhere to ethical norms that are culturally and contextually relevant [88]. Recent contributions to the field by researchers like [89] have expanded VSD to cover more complex AI systems, focusing on participatory design fictions as

a means to explore user values in AI contexts. Design fictions allow for the incorporation of a diverse array of perspectives on potential futures which can anticipate the ethical implications of AI technologies before they are fully integrated into society. Additionally, the work of Umbrello and van de Poel integrates VSD into AI for social good principles, proposing modifications to VSD to address unique challenges posed by machine learning technologies. These adaptations include considerations for transparency, explainability, and accountability, crucial to maintaining trust and efficacy in AI systems [90].

Despite its advantages, VSD faces challenges such as the identification of relevant values and the potential for conflict between different stakeholder groups. The determination of whose values are prioritized remains a significant ethical and methodological question [91]. Ultimately, VSD has significantly influenced the design of interactive and intelligent systems by embedding ethical considerations into the design process. As AI continues to evolve, the principles of VSD are increasingly pertinent to guide the development of technologies that are not only functional but also fundamentally aligned with humanistic values.

### 2.4.2 Participatory and Community-Engaged Collaboration in HCI Research and Design

An examination of democratized and collaborative participation practices among users and communities, let alone minority groups like African Americans, across AI research and HCI literature is marginal [92; 93; 94; 95]. There exists a significant need for the integration of inclusive participatory traditions as exhibited in HCI [96], health [97], community-development, and civic engagement. Scholars and practitioners across the landscape of equity-centered design research and AI, have encouraged the adoption of participation as a method in the earlier product development phases to mitigate impact and scale in industry production [94]. Even though AI design disciplines like NLP and financial services rely heavily on quantitative data to make decisions regarding the lives of users and the basis of their interactions,

that should not negate participatory methods that rely on input of lived experiences as valid interventions that could be introduced within design processes. Such measures, when integrated effectively, have the potential for beneficial impacts on the experiences of users of interactive AI systems long-term. Unlike traditions in user-centered design where the focus is on ensuring that the artifact (e.g., the system, device, object, communication, space, interface, service, etc.) is being designed for the needs of the individual users, participatory "human-centered" design is progressive in designing with users, stakeholders, or people more broadly [98; 99]. The shift from seeing people as users with universal design needs, to realizing people are humans with distinct lived experiences, which should be designed from, with them. In fact, many UCD projects still engage individual-level feedback to inform design decisions, including in ethnographic surveys, interviews, or observations, which are often disjointed methods which rely largely on researcher recruitment of individual participants solely based on users' perceived interaction needs. This perception is one that is interpreted and translated by the researcher to communicate needs for the user. And even with PD approaches like focus groups and design workshops that engage users more deeply, the power to determine what is significant to design and impacts for outcomes, remain at the mercy of the researcher.

Participatory Design (PD) has been a well established design and research practice within the HCI community, following democratic processes like iterative, human-centered design and community collaboration [100; 101; 102]. Participatory design methods can be traced to the 1970s when workers in Scandinavia worked collaboratively to design the technologies that they would use in corporate settings [98; 103; 94; 104]. Over the past several decades, participatory design and related concepts such as co-design and co-creation have been introduced as a way of engaging with ethics, values in design [105], value-sensitive design [106], community-based participation [101; 107] and most recently assets-based design [79].

In regards to interactive AI systems in particular (ASR and natural language technologies), we've seen the emergence of researchers and practitioners already calling into question

the potentiality of more participatory undertakings in within the discipline that are more community-centered and equity-oriented:

Finding the human in the loop - Could we evaluate systems on their ability to support culturally meaningful collaborative work, i.e., actual shared tasks? [108] Why might these languages be stigmatized and what implications could this have on developing NLP systems that are inclusive? [49] How might collaboration with minority language communities inform socio-technical understanding among members and inform design properties of NLP among practitioners? [95] How might employing participation in early stages of ML/NLP development to understand community values, understand stories/histories, and acknowledge positive and harmful futures? [94]

Moreover, there have been recent studies that have focused on leveraging participatory design approaches to engage with marginalized and underserved populations as these groups' voices have been socially oppressed and traditionally denigrated in socio-political contexts [101; 109; 102; 110; 111]. Participatory approaches have been compelling for engaging marginalized communities affected by technology design, understanding challenges and addressing outputs within the context of interactive AI systems [16]. The participation of racial minority groups have been explored already in AI and HCI with the contexts of ASR and language technologies [112; 78; 113], health technologies [114; 115], and various other emerging information and communication technologies. But where the discourse of participation can fall short, is in accounting for existing power dynamics [14], obscurity of the extractive nature of collaboration, openness, sharing, the invasive nature of collecting sensitive cultural data, and questionable corporate and capitalistic interest [94]. Scholars caution against "participation-washing," co-opting participation in design practices applied to AI, with disregard to the industrial prerogatives [116]. Sloane [94] further emphasizes that "participation should be expanded to acknowledge more subtle, and possibly exploitative, forms of community involvement in participatory ML design."

So in my exploration of more democratic participatory approaches that could be used to

support sustainable change in technical design discourse, I found that collaborative community-engaged technology practices (e.g. research, design, development) satisfied a familiar sense of transformative relations in design processes. In response to the AI/ML community's wishes to build more democratic, cooperative, and participatory AI/ML systems [94], I confidently position collaborative community-engaged technology practices as an appropriate approach toward addressing socio-technical consequences of interactive AI systems and other emerging technologies in NLP and banking AI.

The concept of CBPR has appeared in a number of social science and humanities disciplines spanning from community development, civic engagement/policy, education, public health/medicine, and most recently technology and design has seen an introduction. As outlined by Wallerstein [97], there exist a number of variations of the term that can be found across disciplines who seek to intersect within a continuum of community engagement discourses and practices: Which predominantly include: Action Research; Collaborative Action Research; Community-Based Research; Participatory Action Research/Participatory Research; Others expanded terms include: Collaborative Inquiry; Reflexive Practice, Feminist Participatory Research; Community-Partnered Participatory Research; Tribal Participatory Research; Street and Citizen Science; and Participatory Health Research

In 2001, The W.K. Kellogg Foundation's Community Health Scholars Program defined community-based participatory research (CBPR) in the health field as "a collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings." This approach initiates from a research topic prioritized by the community, aiming to integrate knowledge and action for social change to improve community health and eliminate health disparities. Wallerstein [97] proposed a broader scope integrating research and data, stating that "CBPR embraces collaborative efforts among community, academic, and other stakeholders who gather and use research and data to build on the strengths and priorities of the community for multilevel strategies to improve health and social equity." In the context of social and community development, Chun

[117] further elaborated that CBPR is "a collaborative research model based on the notion that communities and researchers can have common or complementary goals and can combine their assets to conduct research that the community uses to create social change." Weil [118] identified the primary audience for such findings as community members, practitioners, and local policymakers, who utilize this information to design interventions benefiting specific geographic or population-based communities.

CBPR can be traced back to two historical traditions of participation in research: the Northern pragmatic tradition, originating with social psychologist Kurt Lewin's action research cycle of fact-finding, action, and reflection proposed in the 1940s, and the Southern emancipatory tradition, which emerged from Brazilian educator Paulo Freire's popular education and the liberatory movements of the 1970s in Asia, Africa, and Latin America [119; 97]. Over time, CBPR has proven effective in fostering culture-centered research, improving external validity, emphasizing implementation contexts, honoring practice-based and community evidence, enhancing reflexive practice, and solidifying connections with marginalized communities to challenge various inequities [120; 101].

Computing research has long engaged communities actively in the research and design process. Particularly within Human-Computer Interaction (HCI), academic researchers have adopted community-based methodologies such as participatory design [121], co-design [122], and participatory action research [102]. These participatory approaches, rooted in civic development, health, and education disciplines, aim to shift from conducting research 'on' passive participants to collaborating 'with' them, thereby leveraging their lived experiences to enhance technology design and application. Recent advancements in computing research have extended the focus from individual user needs and desires to group-level dynamics, including needs, concerns, values, and culture. This stratification transforms group characteristics into community-level determinants of well-designed technical artifacts, emphasizing collaboration with practitioners. Such community-based collaborations have been termed 'CBPR,' alongside other significant terms including Community-based Participatory De-

sign/Research, Community-Based Participatory Action, Collaborative Design Research, and Participatory/Action Research.

### 2.4.3 Adoption and Expansion of Community Engagement in Technology Design

In computing, this shift has led to significant community-driven projects, including the co-design of community-led safety technologies [123; 124] and health technologies [125; 101; 126; 127], as well as initiatives aimed at reducing racial disparities in technology like automated speech recognition [112; 78; 128] and creating inclusive technology experiences for Black young adults [129; 130; 131; 132]. Such participatory research frameworks democratize the academic research process, engaging marginalized communities and challenging the traditional power dynamics that position researchers as the sole experts [102; 121]. Recently, the ethos of community collaboration has permeated the technology industry, particularly within artificial intelligence (AI) development, where recognizing and integrating diverse stakeholder perspectives is crucial to addressing inequities in technology design [133; 134; 125; 94]. Industry efforts now increasingly include community perspectives in developing AI harms frameworks and data annotation practices [135; 136]. Initiatives such as forming community-based research coalitions address responsible AI challenges [137] and partnering with organizations to promote equitable voice technologies for Black older adults [112]. Furthermore, the use of community-based system dynamics has provided insights into racial biases in AI health applications [138; 16].

The field of HCI has broadened its scope to encompass engagements as co-researcher/design and collaborative partnerships that promise to allow individuals who are directly impacted by a phenomenon or technological intervention to play an active role in the design or research process and the ways problems are defined [101; 139; 111]. In areas such as HCI, Design, and Computer-Supported Cooperative Work/Social Computing (CSCW), this approach illumi-

nates design efforts with underserved communities in various geographic regions, stating the importance of this approach to addressing societal challenges [101].

In aligning the conditions of term use, I find that these processes center the same principles and ideological commitments. It is additionally argued that although these different approaches may vary in goals, change theories, and discipline applications, they share a set of core principles [97]. As summarized by Israel and colleagues [140], the following core principles are constant: 1) It is participatory; 2) It is cooperative, engaging community members and researchers in a joint process in which both contribute equally; 3) It is a co-learning process; 4) It involves systems development and local community (hyper-local) capacity building; 5) It is an empowering process through which participants can increase control over their lives; 6) It achieves a balance between research, design, and action. Additionally, Wallerstein [97] contributes an additional CBPR principle that builds on the work of scholars of color, Indigenous, and feminist participatory research. It recognizes the importance of intersectional power and privilege, i.e., how race-ethnicity, racism, immigrant status, gender, sexual orientation, social class, and culture affect the research/design process.

Despite the documented benefits and advancements, there is a recognized need for more critical analysis of these participatory methods [141; 110; 142]. The literature reveals a gap in understanding how community-collaborative practices extend beyond academic settings into commercial technology development. This gap underscores the need to explore the implications of power asymmetries in community-industry partnerships, particularly how they affect the design and implementation of technologies in real-world settings.

### 2.4.4 Fostering Accountability: Democratizing Design, Dismantling Power Structures

Participation of minority groups within a design process serves to democratize structures of power among participants and designers [143]. Situating this undertaking of power is influ-

enced by intersectional feminist epistemologies which examine power in a given environment in order to challenge power [144], along with data feminism scholars who seek to make visible and contribute to dismantling power asymmetries undergirding data collection, analysis, visualization, and decision-making [145; 120]. This is affirmed by CHI papers discussing the position of "power-over" - concerning the relations between actors in design environments [146; 14; 147; 148]. It is essential to challenge power dynamics as asserted by Winschiers et al. [111]: "It is extremely difficult to escape our own traditions of knowledge transfer and recognise the ways power relations affect design decisions." Power exists and presents itself in so many ways, but in AI and HCI, I see participation as an adequate step toward redistributing power across stakeholders in design and research processes to disrupt constructs and dismantle controlling agencies that define how technical systems should be designed and distributed.

Here remains the opportunity to expand modes of accountability with community-based participation approaches which seek to redistribute power more effectively through sustainable mechanisms. Liberatory design practices attempt to address issues of exploitation by emphasizing the relationship between design, power, and social justice. Frameworks like Design Justice, Equity-Centered Community Design, and Viral Justice have promoted community-led practices toward envisioning equitable futures more broadly. This sets the premise that marginalized communities can challenge structural inequalities by designing tech that serves the needs of community-based organizations and social movements [116]. With regard to Black American communities, this means looking to national and hyper-local Black organizations such as the NAACP, The Urban League, African American Leadership Forum, and Center for Black Equity that have long-standing expertise Black community organizing and advocacy. From a community asset perspective, these organizations are already speaking for Black people, addressing the challenges they face, and promoting equity all the while.

Vossoughi et al. [149] argue that equity-oriented design and research must begin with a

clear analysis of institutional injustices and how they shape the lived experiences and pedagogical needs of learners and their communities. This means that technology stewards (e.g. academia, industry companies, research institutes) must be introspective and cognizant to sociotechnical issues, to make way for collaborative community engagement toward building socially good technologies. The concept of "the work before the work" in community collaborations emphasizes building foundational relationships and trust, which is crucial for effective engagement and successful outcomes in technology projects [107]. Approaches to developing trust include team building activities, engaging a strong facilitator who has experience working within community ecosystems, and engaging in collaborative design sprints where a technological program (research, planning) or viable product is produced, all while ensuring that the designs reflect the community's needs and perspectives [150].

For HCI and AI technologists concerned with frameworks of equitable design, engaging with Black community-based organizations (CBO) presents an emergent strategy [151] to resist oppressive technologies. This prompts technologists to commit to work with CBOs that are led by, and have strong accountability mechanisms to, people from marginalized communities [152]. Recently, the emergence of community advisory boards (CAB) have been taken up as a mechanism for designing with CBOs, positioning community-driven decision making throughout the design process while expanding their knowledge and skills [153; 154; 155]. And while the this approach has been well utilized in the contexts of health research and community-development, there exist a wide range of opportunities [78] in further defining how CABs can facilitate more accountability to marginalized communities in technology design processes; increasing engagement among technologists and CBOs, redistributing power across design dynamics, intentionally sharing technical knowledge, and collectively combating harmful and oppressive AI systems.

While scholarship on liberatory and participatory design practices provides a foundation for equitable community-collaborations, it predominantly comes from the perspective of academic researchers and does not speak to the particular challenges faced during community-

industry collaborations. Research is limited on how well these practices scale or can be implemented in industry contexts for commercial technology innovation. Factors such as product development timelines, investor interest, intellectual property, and scalability can arguably limit the feasibility of these practices for industry researchers. More consequentially, as technology companies are increasingly engaging in civic participation [94], we must be wary of the increased burden on communities engaged in collaborative computing research efforts by academia, research institutes, and tech companies [110; 142]. This gap is addressed in the present work by centering the voices of those who work at CBOs and who have collaborated with tech companies specifically—sharing their experiences to inform future community-technology collaborations. Moreover, with the growing focus on public participation in technology development, risks of "participation washing" (i.e. efforts that, on the surface, engage communities but lack any without any meaningful ability to impact outcomes

## 2.5 Literature Review Summary

The literature review presented in this chapter has grounded the work to follow in three primary discourses: racial inclusion and fairness in AI and HCI, critical race theory in computing, and participatory community-based design. These perspectives help address the uneven distribution of AI system experiences among marginalized communities, and the potential for inclusive approaches to create a more equitable technological landscape. The chapter provides a broad overview of the literature on these topics, contributing to the discourse by focusing on contemporary issues, theories, and design justice concepts.

Research in AI and HCI has highlighted the impact of racial and ethnic identities on the feasibility and accessibility of automated systems for minority groups. There is a growing body of work demonstrating the harmful effects of biased AI systems on Black and African American communities. Examples include facial recognition algorithms that misidentify

darker skin tones, predictive policing systems that disproportionately target Black men, and financial lending algorithms that discriminate against Black applicants. Automated speech recognition systems also fail to accurately capture African American English, reinforcing racial disparities. HCI scholars argue for a nuanced understanding of race in algorithmic fairness, emphasizing the need to consider social processes that produce racial inequality and to include the perspectives of those most affected by these systems. Current methodologies often fail to account for the socially constructed nature of race, treating it as a fixed attribute, as opposed to considering the complex cultural processes that produce differences and, subsequently, disparities. Critical race theory for HCI highlights the pervasive racism in socio-technical systems and the need for race-conscious efforts to address these issues.

Digital banking services and financial technologies automate financial activities, but they often exclude Black Americans. Research has documented significant barriers to banking access for Black Americans, including discriminatory lending practices and reliance on high-cost financial services. These disparities are perpetuated by financial algorithms that disadvantage Black loan seekers. While some suggest that automated decision-making could reduce bias, this overlooks the need for systemic change to ensure financial inclusion. Research on Black financial inclusion has begun to examine the impact of financial technology, highlighting how digital banking can reproduce patterns of exclusion. Scholars emphasize the importance of culturally attuned and socially inclusive financial services for underserved Black users. Digital banking applications designed to honor identity and culture present opportunities for more equitable AI systems.

Machine learning researchers are concerned with the impact of natural language processing (NLP) technologies on marginalized language groups. Automated speech recognition (ASR) systems, widely used in various applications, often exhibit performance gaps for non-White speakers. These systems are typically trained on datasets of White Mainstream English (WME), perpetuating linguistic biases and excluding the experiences of minority language speakers. Research shows that ASR systems do not work equally well for all American

subgroups, particularly African Americans who speak African American Vernacular English (AAVE). Studies highlight the need for more inclusive data practices and better representation of minority voices in NLP models. Addressing these biases requires understanding the social context and lived experiences of users, not just technical improvements.

Critical race theory (CRT) examines the appearance of race and racism in cultural expressions, highlighting systemic and institutional racism. It rejects the philosophy of "color-blindness," acknowledging that racism is embedded in social systems. CRT scholars argue for the importance of lived experiences and storytelling in understanding and addressing racial disparities. CRT has influenced technology studies, highlighting the need to address racial inequalities perpetuated by technological systems. Scholars emphasize the importance of recognizing the complex social identities of users and integrating their experiences into the design process. An assets-based perspective can further operationalize intersectionality in AI and digital system design.

HCI and design research increasingly adopt asset-based approaches, focusing on the strengths and capacities of marginalized communities. Cultural sociologist Ann Swidler's theory of culture-in-action is used to understand how individuals creatively use culture to solve problems. This perspective emphasizes the importance of cultural resources in developing strategies of action. Participatory design methods involve users as active collaborators in the design process, emphasizing the importance of community input. These methods have been applied in various contexts, including ASR and language technologies, to address the needs of marginalized groups. However, there is a need for critical analysis of power dynamics and potential exploitation in participatory practices.

Values Sensitive Design (VSD) systematically integrates human values into technology design, addressing ethical considerations such as privacy, fairness, and accountability. This approach has been adapted for AI systems, ensuring they align with cultural and contextual values. VSD emphasizes the importance of diverse stakeholder perspectives in the design process. Despite its advantages, VSD faces challenges in identifying relevant values and

managing conflicts between stakeholder groups. Despite these challenges, it has significantly influenced the design of AI and HCI systems by embedding ethical considerations into the design process.

Addressing power dynamics in design processes is essential for creating equitable technologies. Liberatory design practices emphasize the relationship between design, power, and social justice. Engaging with community-based organizations and adopting community advisory boards can enhance accountability and ensure the design process benefits marginalized communities. The chapter highlights the importance of integrating racial inclusion, critical race theory, and participatory design in AI and HCI research. By addressing these issues, researchers and practitioners can create more equitable and justice-oriented technological systems that serve the needs of marginalized communities.

# Chapter 3

# Exploring Black User Experiences and Needs with Digital Banking Services and Financial Applications

## 3.1 Introduction

As described in Chapter 1, the empirical basis for this dissertation is three studies which address the Black experience with technology in terms of the relationship between design and culture. This chapter[1] presents the first of these studies, which investigates the success of the financial application CashApp among Black American users. The analysis of survey, diary, and interview data from Black Cashapp users provides a salient illustration of how technological design choices can resonate with the cultural attitudes and culturally-specific needs of a particular population. As opposed to the case of automated speech recognition presented in Chapter 4, the CashApp study in this chapter is an example in the positive – the

[1]**Published Article Title:** The Cost of Culture: An Analysis of Cash App and the Financial Inclusion of Black American Communities. Contributing Authors: Cunningham, Jay L., Sydney T. Nguyen, Julie A. Kientz, and Daniela Rosner. In Proceedings of the 2022 ACM Designing Interactive Systems Conference, pp. 612-628. 2022.

app has been well received by Black users and Black culture – and an understanding of the design choices that have contributed to this success can provide insight for the development of a broader framework for culturally relevant technology design.

Over the past decade, financial technology (or "fin-tech") has become a multi-billion-dollar industry, amassing over 280 million users in the United States alone [156]. This increasing participation foregrounds a shift from internationally interoperable systems such as the Visa and Mastercard network to compartmentalized platforms like Cash App and has introduced new and different mechanisms for financial transactions and management.

The potential benefits of and experiences with fin-tech apps, however, have affected communities unevenly [157]. Recent reports identify almost half of Black households as unbanked (i.e., not served by a bank or similar financial institution) [158]. According to a recent Bankrate survey [159], Black and Latinx Americans pay nearly twice as much as white Americans to maintain a checking account through increased maintenance and overdraft fees, among other factors. Throughout the past century, a large body of scholarship has traced legacies of traditional banking practices and their entanglement with harmful and discriminatory practices within brick-and-mortar branches [31; 29; 30]. From institutions that promote intimidation to predatory lending practices, scholars trace institutional distrust that limits access to mainstream services for Black Americans [160; 30; 32; 34]. As journalist Lauryn Nwankpa observes, "When you consider this lack of representation and its impact, is it any wonder that these communities don't have a positive relationship with big banks?" [158].

The DIS community has long been concerned with addressing complex social, cultural, economic, and environmental disparities through design justice and activism [12; 14; 161]. But its attention to financial inclusion, and mobile payment services in particular, has only begun to engage with racial equity concerns [162; 28]. To address this important gap, I emphasize the need for designers and design researchers to not only advocate for financial well-being among economically disadvantaged communities but to also design thoughtful and

liberatory interventions, services, and experiences. As digital money becomes a standard way of payment, design scholars must recognize the implications of historical and continued discriminatory financial practices while amplifying the ways in which marginalized and disadvantaged communities persevere to participate in an economy that was never designed for their success [79; 163; 164].

In particular, this study investigated the following research questions:

- RQ1: What are the motivations, values, and knowledge that drive engagement with Cash App and other financial technologies among Black American communities?

- RQ2: What fin-tech design decisions support the economic development of Black American communities?

- RQ3: What role do Black American users of fin-tech see emerging mobile financial services playing in supporting increased economic agency and financial inclusion for Black communities?

To examine these questions, mixed-methods study was conducted with African American adult users of the mobile payment platform Cash App. The focus on African Americans was intended to address the possibility for increased financial inclusion amongst a racial ethnic community that has been historically marginalized and excluded from financial autonomy in the U.S. This work engaged three study methods: an online survey, a 30-day diary study, and semi-structured user interviews to explore participants' experiences, motivations, and values of using Cash App and fin-tech alike.

Through the analysis of the collected data, several critical insights surfaced regarding African Americans' experiences navigating and using fin-tech. First, while Cash App allows participants the flexibility around scheduling transactions from any location, it introduces hidden fees and social media gamification strategies that compel unwanted financial risk (such as participation in sweepstakes). Second, although Cash App offers control and easy

access to financial resources, it hides responsibility for opaque transactional errors. Third, while Cash App enables participants to avoid financial institutions they distrust, it introduces new gatekeeping structures through a lack of live customer service, transparency, and accountability. Lastly, although Cash App offers helpful features for managing and tracking transactions, it provides little support for gaining financial literacy. We end the paper with a discussion of central questions and opportunities raised by the study findings. These opportunities include the expansion of HCI conversations on trust and trustworthiness within communities and a consideration of the varied qualities of cultural "assets" in assets-based design with fin-tech [80; 165].

## 3.2 Related Work

The previous chapter 2 presented a broad review of the discourses in which this dissertation is situated. This section provides some additional discussion on scholarship that informs an analysis of race and economic development within the specific context of financial services technologies. This more narrow review focuses on three central bodies of literature: (1) the historical financial exclusion of Black Americans, (2) design research on fin-tech, and (3) assets-based design in the fin-tech context.

### 3.2.1 Historical Financial Exclusion of Black Americans

The extant body of literature, which spans multiple disciplines including economic history, political science, sociology, and design, has extensively analyzed the historical financial exclusion of Black Americans. Scholars focusing on urban studies have documented the persistent and significant restrictions on Black Americans' access to bank branches, indicating a systemic limitation in financial inclusion [29; 30]. In parallel, economists have underscored the perpetuation of wealth disparities, emphasizing how low expectations for mutual financial support have contributed to these enduring economic inequalities [31]. Sociological research

has highlighted the reliance of low-income Black American mothers on informal care and community networks for financial relief. Notably, studies indicate that in the event of emergency expenses, Black women are disproportionately affected by financial shocks, being three times more likely than white individuals to resort to informal borrowing [30]. Furthermore, the prevalence of high-cost and predatory financial and lending programs, as opposed to mainstream financial services, has been identified as a consequence of institutional distrust, reinforcing the financial marginalization of Black communities [160; 30; 32; 34].

These inequitable financial conditions contribute to a legacy of financial exclusion and resource extraction along racial lines, a phenomenon that Black studies scholar and political scientist Cedric Robinson has conceptualized as racial capitalism [166; 167]. Analyzing the period from 1974 to 1992, political scientist Michael Dawson observed that Black unemployment fell below ten percent in only five quarters, illustrating the persistent economic disadvantages faced by Black Americans [168]. More recent data from the Federal Deposit Insurance Corporation (FDIC) reveals that 18% of Black households are unbanked, compared to only 3% of white households, further illustrating the ongoing financial exclusion faced by Black Americans [30; 169]. Amidst fluctuations in economic and banking regimes, scholars consistently point to the extraction of social and economic value from Black Americans as a constant condition, underscoring the entrenched nature of these disparities [170].

Conversely, research within the fields of finance and economics has challenged the narrative of discrimination against Black individuals in banking, providing critiques related to perceived creditworthiness [35], racial bias in business credit scoring [36], and the role of automated decision-making in small business lending [37]. Ard and Meyers (2001), for instance, examined the so-called "bad credit" myth within the Black community through an analysis of national datasets measuring wealth and expenditures. Their findings indicate no statistically significant difference in the average level of bad credit between Black and white individuals who have been denied or have forgone loans. The authors further argue that discrimination in lending has fostered an aversion to credit within the Black community,

suggesting that even when creditworthiness is not an issue, historical experiences of bias and discrimination influence decisions about whether to pursue lending. Another study tested for racial bias in business lending and found no evidence that minority business owners faced undue penalties when using business credit scores for borrowing [36]. While these findings may hold statistical validity, they risk overlooking the broader historical difficulties experienced by minority business owners in securing credit. These challenges encompass various factors, including the treatment encountered when attempting to borrow, access to credit and capital, repayment capacity, and even the reluctance to apply for loans due to fear of denial [36]. Even in instances where automated decision-making processes might reduce racial bias in financial services [37], such mechanisms do not address the deeper systemic and social responsibilities required to effect lasting change in the financial inclusion of Black communities, as opposed to merely implementing temporary technological fixes.

Turning to the role of emerging forms of financial exchange, scholars have identified a range of resourceful informal networks within Black communities, including practices such as "blessing circles" [171], practical kin support (assistance with transportation, household work, and child care) [172], and both digital and non-digital remittances [168; 173]. Despite the evolving nature of digital services in these practices, research on Black financial inclusion and informality has only recently begun to explore the impact of financial technology on these longstanding practices within the Black community.

### 3.2.2 Engineered Financial Inequality

Over the past three decades, design and HCI literature has increasingly considered the relationship between financial services and digital developments. To date, this work has focused on a range of platform issues, including dynamics of distributed ledger technologies like blockchain and digital-born currency like bitcoin [174]; the evolving character of algorithmic explainability [40]; privacy and trustworthiness in banking ref [41]; and the transnational flow of information and disinformation on e-commerce platforms [175]. Looking across var-

ied contexts, from Indian rickshaw drivers [176], to Ghanian maize farm households [177], several scholars focus on individual mitigation of financial stress, advocating for the design of reflective prompts with concepts like 'friction' [176]. Tracing cases of techno-solutionism, others examine apps like Even that ostensibly help low income users keep better track of their money while practically trapping them in a payment scheme that further entrenches conditions of inequity and hides the app's direct responsibility for harmful repercussions [178]. The promise of financial control through a digital service places the burden of fixing poor healthcare and wage regulation on the most vulnerable users. While this work has highlighted forms of techno-capitalism that harmfully shape people's everyday experiences, it often leaves the vital issue of race and racial capitalism under-explored [42].

In parallel, critical scholars of design and computing, particularly Black code studies [179; 17; 18; 73], have emphasized the importance of bringing a historical lens to economic matters, with a focus on the entanglements between wealth and race, class, disability and other facets of digital subjectivity. A formidable body of work across fields of economics, sociology, anthropology, Black studies, and urban studies has examined Black American economic experience [180; 29; 181; 182; 183]. Until the 1970s, the United States Federal Housing Authority drew up maps outlining neighborhoods segregated by race, a practice now known as redlining [184]. Using the maps, banks could deny Black applicants' loans and effectively prevent them gaining property. In tandem, housing associations drew up racial covenants that prevented Black people from buying housing, ultimately reproducing, and expanding residential racial segregation within the United States [31].

Examining recent cases of insurance algorithms and healthcare diagnostics, scholars reveal the strong role digital services play in reproducing patterns of exclusion and control. Scholars like Safiya Noble, Ruha Benjamin, and Seeta Peña Gangadharan document continued practices of racial redlining within the financial technology industry—leading financial institutions like credit unions to use racialized categories such as "Ethnic Second-City Strugglers" to send targeted ads for exploitative products such as subprime lending programs [71; 184].

The same practices that government and municipal actors tout as neutral (non-race-based real estate categories) instead end up obscuring their racializing effects and further reproducing race-based financial disadvantages (poor credit scores and data profiling for subprime lending) [185, p. 362] —- a process Safiya Noble calls "technological redlining."

Across this work, credit scoring presents a particularly potent case study [17; 186]. Multiple studies of credit scores used for credit acquisition have shown that credit bureaus disproportionally give African American and Latinx customers lower scores, groups who are already less likely to have credit history necessary to generate a credit score. This uneven practice reinforces further inequities around gaining credit card accounts and accessing homeowner and auto insurance (underwriting and pricing), exacerbating racial disparities in wealth assets. In a 2007 report on the racial impact of credit scoring the National Consumer Law Center advocates taking race into account in scoring algorithms, warning: "Credit scores act as both a numerical reflection of that [racial wealth] gap as well as a force widening the gap" [186].

Important in this discussion is Oscar Gandy's notion of rational discrimination wherein scholars shift their attention beyond the creation of unconscious bias and harmful discrimination to the recognition that these biases and harms already exist within our financial infrastructure, and that by ignoring them we also reproduce them. Eubanks writes, "When automated decision-making tools are not built to explicitly dismantle structural inequities, their speed and scale intensify them" [185, p. 190].

### 3.2.3 Cash App

Preliminary research into Black communities and Cash App suggested that cultural attunement, relativity, and influence have played a significant role in the adoption of the mobile app among African Americans [43; 44; 187]. In fact, over the past few years, Cash App™ has become widely popular and ingrained in hip-hop and urban culture, originally in the U.S. south [43]. According to the music database Genius, nearly 200 hip-hop artists have

name-checked "Cash App" in their lyrics [188; 189]. One of the most popular examples is Roddy Ricch's 2020 megahit song "The Box" where he boasts the lyrics ("She sucked a n***a soul, gotta Cash App"), which grossed over 4.7 million song units sold by the middle of that year [188]. With hundreds of references to Cash App in rhymes and songs, it is difficult to pinpoint exactly when this popularity surged, but since around July 2017 rappers have woven the platform into hip-hop lexicon [44]. Along with this integration into popular media, reports have shown that Cash App's U.S. geographic presence is highly concentrated in the south, with increased popularity among low-income consumers in cities with a large Black population density like Atlanta [43]. Cash App dominates in southern states (Alabama, Georgia, Mississippi, Tennessee, Florida, Texas) which is striking for a technology company, particularly one based in San Francisco, CA [43]. But in light of unbanked rates, those locations are the among highest [158]. Square CEO Jack Dorsey confirms this correlation in a 2018 statement: "People are using this as their primary banking account, and in some cases it's their only bank account... We are reaching an audience that is under-served and even to the point of unbanked, which wasn't a stated goal but it's something we love and want to lean into more" [158]. With these unique overlaps in mind, this research further investigates the adoption of Cash App among African Americans.

### 3.2.4 Assets-Based Design

Human Computer Interaction (HCI) and design research literature has long addressed the impacts and implications of technical affordances and interventions, with a critical lens on social inequities and racial justice [28]. This literature complicates the design of information and communication technologies (ICTs) that overlook historically marginalized groups for whom financial, emotional, and social resources are already scarce [35]. A growing body of work in HCI and design research [190; 45; 101] has built upon equity-centered approaches in community health, community development, and education literature, emphasizing marginalized users' capacities for driving change [79]. And while the goal of creating ICTs is indeed

to support users in navigating their challenges corresponding design processes seemingly prioritize findings and address users' needs as if they were deficiencies that only new, externally managed ICTs will fix [191]. These perceptually impactful processes lead to the creation of ICT solutions that devalue a user's agency in conceiving and pursuing transformational pathways, making the user's development the responsibility of others [116; 192; 83]. In response, design researchers have increasingly explored and implored an assets-based approach to research and design for ICT solutions. Scholars like Wong-Villacrés and colleagues have focused on community-based approaches, developing design guidelines, online resources, and workshops that facilitate a range of financial, social, and communicative tasks, interweaving intersectional considerations of technology development and use [192; 83]. Progressively, this approach centers the design process on identifying individuals' and communities' strengths and capacities, exploring feasible, user-centered pathways for people to build on existing strengths to achieve desired and sustainable change [193; 194; 164]. As assets-based design approaches continue to evolve and expand, their role in developing equitable fin-tech has yet to be defined.

## 3.3 Methods

The goal of the study described in this chapter was to use a mixed methods approach to investigate African American's perceptions of the relationships, engagements, and experiences in the context of their use of mobile financial technology (fin-tech) applications. Recruitment methods were designed to reach a diverse range of African American adults who indicated they were active users of the mobile payment service Cash App. All participant communications, interactions, data collection, and data analysis were conducted virtually given the ongoing COVID-19 pandemic in 2021 and my ability to reach a wider range of participants across the U.S. The following subsections describe the details of recruitment and data collection, which included using a broad-reaching survey, followed by a diary study, and then a

smaller number of in-depth interviews.

### 3.3.1 Study Population

The approach to recruitment played an essential role in helping us define the criteria for participation (RQ1) and to appropriately understand people's experiences using Cash App, with a focus on how the platform has impacted their economic development and fiscal soundness (RQ2). The study population was limited to African Americans due to the unique historical conditions that have impacted this demographic's economic access and development in the U.S. [195]. Studies have shown [157; 29; 182]that generations of African Americans have faced compounded injustices that may prevent them from gainfully engaging with financial institutions, and thus fully taking part in what some call the "American Dream." From chattel slavery to contemporary institutional oppression and social marginalization, Black communities across the U.S. have been and continue to be plagued by racism, discrimination, and intimidation, which has impacted all aspects of modern life [63].

The designation of the study population was approached using the lens of critical race theory [196; 65] to conceptualize African Americans and engage methods informed by grounded-theory approaches that directly examined their historical lineages of in the U.S., interrogated the experiences of Black Americans in American economics, and exposed implications for mobile fin-tech in fostering financial access and equity in Black communities. In line with this understanding of the population, the lead researcher developed inclusion criteria that positioned race, ethnicity, and citizenship as critical facets of participant identity. Participants in the survey, diary, and interview components of the study met the following criteria: 1) identify as Black American 2) a U.S. citizen, 3) reside within the U.S., 4) 18 years of age or older, 5) have an account and actively use Cash App, 6) have access to the Internet and a data-enabled smartphone, 7) self-indicated having digital literacy, and 8) identify as generationally African American. This last criterion was essential, under a recognition that the Black diaspora is diverse and while African Americans may identify as Black, not all Black

identifying persons are African American. I provided interested participants with several classifications that may describe how they may identify with being African American on the screener survey. For the purpose of this work, African Americans are recognized as those who are American descendents of enslaved Black Africans during the 16th to 19th centuries [167].

### 3.3.2 Data Collection

#### Survey

The initial data collection step, the online survey, served two purposes: (1) to collect general data from a large population to inform subsequent study phases and (2) to recruit participants for later parts of the study. To ensure that the study reached a wide array of participants from across the U.S., study recruitment materials were distributed primarily through online and social media platforms such as Facebook posts and ads, Twitter, Instagram, and messaging services such as GroupMe, WhatsApp, and Telegram. I also also conducted offline recruiting through local reputational case sampling to reach participants regardless of their digital literacy or Internet access [197]. In addition, I connected with community organizations with whom I had previously developed relationships with.

At the beginning of the survey, interested candidates were provided with an overview of study involvement details including location, compensation, an information statement outlining the risks and benefits, and participation requirements. Candidates were then prompted to complete the survey to express interest and declare their eligibility. The survey consisted of thirty-seven questions, including comprehensive demographics and questions about Cash App and fin-tech use, and took approximately 10-15 minutes to complete. This study protocol was reviewed and approved by the University of Washington Institutional Review Board (IRB). There were 405 total survey submissions from participant interest and eligibility screening. When applying the exclusion criteria, this was narrowed to 350 qualifying candi-

dates, eliminating 55 ineligible individuals according to the inclusion criteria (see above).

### Diary Study

To understand participants' behaviors and experiences that may drive engagement with Cash App and other forms of fin-tech, a subset of survey respondents who had indicated they were active users of Cash App were invited to participate in a diary study to contribute weekly diary entries to report their varied financial activities and describe how they used Cash App. A diary study is a research method used to collect qualitative and quantitative data about behaviors, activities, and experiences over time [198]. Using this method, participants self-report data and log specific information about themselves, constructing a "diary" over a period of time.

To recruit for the diary study, the research team reviewed the 350 survey responses and applied the following eligibility criteria for the diary study: 1) ways in which they use Cash App (financial activities), 2) frequency of Cash App use, 3) whether they have a traditional (FDIC-backed) bank account, 4) whether they have a credit union account, and 5) whether they are unbanked. We also aimed to balance recruitment of participants across the following demographic attributes: 1) gender/pronouns, 2) disabilities, 3) income classification, 4) job classification, 5) neighborhood setting (urban, rural, sub-urban), 6) whether they perceived their community to be low/under resourced, 7) state of residence, 8) zip code, 9) number of dependents/care-dependents, and 10) highest education level.

Based on these criteria, 24 participants were invited to engage in the diary and interview study phases, of which 21 enrolled and completed at least 1 diary entry. Participants then completed a consent form, chose a pseudonym to be used in order to protect their identities, and attended a mandatory asynchronous on-boarding orientation facilitated via video recording. After successfully on-boarding, participants were given access to a "resource drive" containing study documentation and content.

The participants adopted the "snippet technique," which is an effective activity logging

method in which individuals document short snippets of their Cash App use in-situ, then recall such details of the activity at the end of each day, or when they have time [198]. For 5 weeks (30 days), participants received daily email and text reminders to submit via a mobile JotForm survey a minimum of 4 diary entries per week, regardless of whether they used Cash App, estimating roughly 40 minutes each week of study engagement.

The research team deemed a minimum of 4 diary entries per week as active use among participants, and participants were thus asked to fill out a diary regardless of whether they had used Cash App since their last diary submission. Participant compensation entailed a $25 USD digital Amazon.com gift card for their involvement each week for up to 5 weeks, pending their successful diary submissions, for a total of $125 USD. Participants who consecutively failed to submit diary entries after 2 weeks were considered withdrawn from the study. To further encourage and promote sustained participation, participants were given the option to join a private Facebook group in which they could communicate with the research team, along with sharing relevant resources and appropriate content with other participants, which 8 participants joined. Neglecting to join did not impact the individual's ability to participate. Each participant was required to consent to the terms of online engagement and maintain other participants' privacy to be able to join the group. The digital nature of this study required that all participants had access to a Wi-Fi or Internet enabled smartphone. Addressing the costs associated with obtaining services or providers was beyond the scope of the study efforts.

### Interviews

To gain a deeper empirical understanding of participants' experiences with Cash App and other fin-tech applications, all diary study participants were invited to participate in a 45–60-minute semi-structured interview with two members of the research team during Week 5 of the study. Fifteen participants agreed to be interviewed by the research team (see ). Semi-structured interviews provide richly detailed data through story-telling and experience-

sharing, which allowed us to explore nuances of an individual's experiences [199]. The goal of these interviews was to help us 1) further understand motivations, values, and knowledge of participants who use Cash App; 2) learn of design features/aspects of Cash App that could facilitate or regress the development and continuation of fin-tech inclusion for African American communities; and 3) understand how people see the role of emerging mobile fin-tech in supporting increased economic agency and financial inclusion for African American communities. All interviews were digitally recorded with participant consent via Zoom Meeting and transcribed via a third-party transcription service. Two members of the research team conducted the interviews, with one person facilitating the experience and asking questions and the other person taking notes to capture insights and allow for full interviewer attention. The interview guide included questions on topics that addressed: 1) how Cash App and fin-tech more generally are used, along with broader economic impacts for African Americans, 2) social, cultural, and assets-based values and conditions that explored individuals' perception of ways in which their community persist, navigate, and even emancipate themselves through the American financial/banking system, 3) community social and cultural wealth used in promoting hyper-local economic development and implications for such factors through fin-tech, 4) experiences of users' wealth attainment opportunities from investing stocks and cryptocurrency to starting and sustaining Black-owned businesses, 5) experiences of users leveraging Cash App and fin-tech alike for giving, donations, charity, and mutual aid to support their communities. Shortly after each interview, researchers collectively reviewed notes and wrote summaries of key insights. I followed up with participants after interviews for any necessary clarification and to confirm researcher interpretations. The first two authors supported data collection, along with five student research assistants via a for-credit research seminar. I compensated participants with a final $25 USD digital Amazon gift card for their interview involvement.

### 3.3.3 Data Analysis

Data variables included qualifying data collected from the survey and observations made during recruitment (RQ1), diary entries surrounding types of financial activities and ways in which participants use and leverage Cash App for economic agency (RQ1 and RQ2), and interview data (RQ1, RQ2, RQ3). All authors supported analysis activities and held regular meetings to discuss and contextualize the results.

First, I analyzed the survey data among respondents. These included pre-screened eligibility criteria, along with demographic attributes, and recruitment observations and analytic memos. I summarize key insights obtained from the survey. Next, I analyzed diary journal entries by deductively pre-setting categories in which participants could associate the nature of financial activities they conducted via Cash App (e.g., Personal Banking, Transfers, Finance & Bill Paying; Income (Wages, Labor, Pay); General Purchases, Goods & Services (non-black); Giving, Donations, Charity, Church & Mutual Aid; Investing (Stock & Cryptocurrency); Other). Along with this, I analyzed prompts that related to people's motivation for use, feelings or emotions associated with use, whether the financial activities were planned, and whether the participant used a digital finance tool other than Cash App for an activity. I began with a priori codes that addressed the first research question and pre-set deductive categories. I then openly coded through an inductive approach derived from descriptive data of prompt responses. The research team met to review the codes and reach a consensus through iterative clustering and high-level thematic analysis.

Finally, to address and inform the first, second, and third research questions, I first reviewed notes taken during the 15 interviews. Using a grounded-theory-inspired approach, the facilitating pair of researchers conducted a first-pass review of resulting interview transcripts, recalling the interview contexts, reading, and highlighting significant participant quotes, and inductively assigning codes to various excerpts through open coding. Upon completing this first pass, the codes produced were added to code-book, followed by iterative review to refine

emergent codes, until I came to a point of theoretical saturation. Lastly, I defined central themes by breaking the emergent codes into sub-codes to better organize the data for reporting key findings.

### 3.3.4 Participant Overview

There were 21 total participants (see ) who I considered enrolled in the study (i.e., they completed at least one diary entry in the diary study). Seven participants completed fewer than eight entries across the five weeks, and 15 agreed to be interviewed. Participants ranged in age from 19 years old to 55, with an average age of 36. There was a majority of woman-identifying participants; 16 identified as a woman, 8 identified as a man, and no participants identified as non-binary. Only 1 participant described coming from a rural neighborhood, with 8 coming from suburban neighborhoods and the remaining 13 coming from urban neighborhoods. Participants self-described their perception of whether their neighborhood was considered low-resourced, with 7 saying "Yes", 13 saying "No", and 2 saying "Unsure." Participants came from 12 different US states plus D.C., including 4 from Alabama, 2 from North Carolina, 2 from Georgia, 2 from Texas, 2 from New York, and 1 each from Michigan, Tennessee, California, Washington, Pennsylvania, South Carolina, Missouri, and Washington, D.C. All were U.S. citizens. In terms of education level, 8 had Bachelor's degree, 4 had master's degrees, 3 had community-college (associates/trade) degrees, 3 had some high school, 2 had high school diplomas or GEDs, and 1 had a PhD/MD/JD. The income levels ranged widely, with 8 having incomes between \$0-\$29,999, 5 having incomes between \$30,000-\$49,999, 4 having incomes between \$50,000-\$99,999, 2 having incomes between \$100,000-\$349,999, and 2 having incomes greater than \$350,000. The majority of participants had traditional bank accounts (e.g., FDIC backed) (76.1%), while the remainder (23.8%) did not have traditional bank accounts. In terms of employment status (of which they could select more than one), participants indicated they were Full-Time (12), Part-Time (4), Gig Workers (5), Students (5), Contract Workers (2), and Unemployed (1). Finally, I gave participants a wide range

of options to indicate their racial identities as African Americans, of which they could select more than one. Participants identified themselves as follows: An American citizen of Black African descent/ancestors (11 participants), A Black American (17 participants), An American descendent of enslaved Black Africans by the U.S. from 16th - 19th century (16 participants), and First Generation African American (2 participants). Figure 3.1 provides a summary of a subset of the demographics of the participants, including the participant IDs and their chosen study pseudonyms.

| Enlisted Study Participants (n=21) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Part. ID+** | **Pseudonym** | **No. of Diary Entries** | **No. Unique Transacti–ons Reported** | **User Interview** | **Age** | **Gender** | **Neighbor-hood Setting#** | **Perception of Neighborhood (Low-Resourced)** |
| P1* | Bankroll | 2 | 8 | | 32 | Man | Urban | Unsure |
| P3 | Big Dinero | 23 | 5 | ✅ | 23 | Woman | Urban | No |
| P4 | Exquisite 6 | 26 | 25 | ✅ | 50 | Woman | Urban | No |
| P5 | Abundance Queen | 18 | 42 | ✅ | 23 | Woman | Suburban | Yes |
| P6* | Ka$h Doll | 3 | 3 | | 25 | Woman | Urban | Yes |
| P7 | KashMoney | 33 | 14 | ✅ | 22 | Woman | Suburban | Yes |
| P8 | LakerGirl | 41 | 7 | | 38 | Woman | Urban | No |
| P9 | The Green Queen | 18 | 11 | ✅ | 23 | Woman | Urban | Yes |
| P10 | KG | 32 | 19 | ✅ | 43 | Man | Urban | No |
| P11 | KayKay | 22 | 12 | ✅ | 46 | Man | Suburban | No |
| P12* | Jay$ | 1 | 4 | ✅ | 40 | Woman | Urban | Yes |
| P13 | Felix Star | 22 | 16 | ✅ | 32 | Man | Suburban | No |
| P14* | Big Baller | 7 | 7 | ✅ | 23 | Man | Urban | No |
| P16 | Post-Welfare Wonder Woman | 18 | 14 | ✅ | 34 | Woman | Suburban | Yes |
| P17* | MoneyMama | 1 | 2 | | 50 | Woman | Urban | Unsure |
| P18* | Paulus | 3 | 0 | ✅ | 35 | Man | Urban | No |
| P19 | Breadwinner | 23 | 7 | ✅ | 19 | Man | Suburban | No |
| P20 | Miss Money Magnet | 28 | 9 | ✅ | 24 | Woman | Urban | No |
| P22 | Mopptop43 | 28 | 7 | ✅ | 43 | Woman | Rural | No |
| P23* | PaidNfull | 3 | 6 | | 24 | Woman | Suburban | Yes |
| P24 | Dug Jonson | 19 | 17 | | 55 | Man | Suburban | No |

Figure 3.1: Overview of participants who completed the diary study, the interview, or both

***Figure Details:***

- * Had below 8 submissions within the 30 days
- R̂ural - a community with lots of nature and open spaces, with fewer people and buildings than urban or suburban areas.; Suburban - a community where people live just outside of a city or town. There are lots of houses in suburban areas, but not as many other buildings as urban areas; Urban - a community that is within a city or town (metro): lots of people live there, and there are lots of different kinds of buildings close together.
- + Some participant IDs are missing due to enrolling in the study, but never completing a diary entry or interview.
- Participants were asked to self-select their own alias names related to money.

## 3.4 Findings

### 3.4.1 What are the motivations, values, and knowledges that drive Cash App use?

The diary study allowed us to understand the frequency and nature Cash App use and helped us contextualize the interviews. Over the course of the four weeks of the diary study, the 21 participants logged a total of 371 reports recording their use of Cash App, with an average of 17.6 entries per person and a median of 19. The maximum number of entries logged was 41 entries (P8), and eight participants logged fewer than eight entries over the course of the four weeks (that is, they did not meet the minimum threshold for participation in the study). Of the 371 entries, approximately 39% (145) reported on a recent Cash App use, and the remainder reported no recent use since the last diary submission.

Diary study participants logged a total of 285 unique transactions (seeFigure 3.2). The average amount for the transactions was $80.40 with a median of $27.97, the lowest amount being $0.11, and the highest amount being $1,000. The most common transaction type was General Purchases, Goods & Services (37.9%), followed by Personal Banking, Transfers, Finance & Bill Paying (26.3%); Investing (Stock & Cryptocurrency) (8.1%); Giving, Donations, Charity, Church & Mutual Aid (4.9%); and then Income (Wages, Labor, Pay) (3.9%). Although Investing consisted of 8.1% of the transactions, this was accounted for by only 3 of the participants making multiple transactions, with the majority of the investing transactions (82%) reported by P4 alone. Of the general purchases, goods, and services, 73.1% went to non-Black businesses and 26.9% went to Black-owned businesses. Many of the activities (50%) were planned, with the remainder being unplanned (43.6%) or recurring (6.4%). (Figure 3.2) shows an overview of the transaction types, along with examples of each type in the words of the participants.

| Overview of Transactions Recorded (N=285) | | |
|---|---|---|
| General Purchases, Goods & Services | 37.9% | |
| Black-Owned | 26.9% | "Paid for THC" "Haircuts"<br>"Pay for food at a cookout" "Pay for food at a cookout"<br>"Psychic readings" "BBQSause" |
| Non-Black Owned | 73.1% | "Coffee" "Doordash food"<br>"Made a purchase at CVS" "Grocery store purchase"<br>"Gas" "Got my nails done" |
| Personal Banking, Transfers, Finance & Bill Paying | 26.3% | "Money given by family member" "Taking care of a dog"<br>"Pay rent" "Receiving cash for child's celebration"<br>"Basketball bet" "I paid an outstanding debt"<br>"Got a cash app from my sister" "Receive money for Father's Day gifts" |
| Investing<br>Stock & Cryptocurrency | 8.1% | "Crypto investing" "Invested in stock (GameStop)"<br>"Bought Bitcoin" "Sold Stock (AMC)"<br>"Checked bitcoin" |
| Giving, Donations, Charity, Church & Mutual Aid | 4.9% | "Paid for client's entry fee" "Sent money to family for birthday"<br>"Birthday club" "Helping a friend"<br>"Donation for sports tournament". "Sent money to daughter who's away at college" |
| Income<br>Wages, Labor, Pay | 3.9% | "Refereeing" "Mary Kay payment"<br>"Received pay check" "Received funds from a project I completed"<br>"Received tip from a customer" |

Figure 3.2: Overview of the 285 Cash App transactions reported across the 4 weeks of the diary study

Interview participants overwhelmingly described using Cash App as a supplemental financial tool focused on funds that they allocated for leisure activities, used at their discretion, and typically left unplanned. These "miscellaneous" (P7) expenses could include personal endeavors such as regular upkeep transactions such as hair (P3), yard work (P4), small business exchanges (P5), and unexpected events related transport (P5) and autonomy; social activities like fun hobbies and gifts for family and friends (P12); and community-centered efforts such as church donations (P13), alumni events and contributions (P4), and communal support such as helping a classmate whose house burned down (P4) or sharing funds when a loved one was in need (P18).

A notable set of interview participants (P4, P5, P13, P14, P18, P19) described Cash App as playing an important role in their daily activities and lifestyle. Participants described experiences of being paid for services related to their professions (e.g., independent-contracting (P19), adult entertainment (P22), and content creation (P13) via Cash App (P4)) as well as being able to start and sustain "side-hustles" (P9) and splitting expenses with friends for streaming services due to unaffordability (P9). Others (P3, P5, P14) shared using it as a last resort tool, where convenience played a role in purchasing goods and services or transferring and receiving funds. . P3, who graduated from college four years ago and now banks with two separate banks, describes using Cash App only when necessary due to prior challenges: "I just like how simple it is to use, and pretty quick. [...But ] sometimes I use it as a last resort. Participants like P3 saw Cash App as an adequate alternative to banking due to its speed and ease of use, but also encountered notable challenges and delays in transfer experience that curtailed their reliance on the service. Additionally, participants (P4, P9, P12) emphasized how the availability of digital banking contributed to their financial awareness (P9), access (P12), and knowledge (p16).

Participants' stories and survey respondents' feedback cast funds available in Cash App as "everyday spending money or just kind of money off to the side" (P13), whereas they tended to frame bank account money as used primarily for "bill money" (P13). This dis-

tinction seemingly positions traditional bank accounts as more useful than mobile services for static financial responsibilities. But a small sub-set of interview participants (P5, P12, P13, P14, P19) described replacing traditional banks with their use of Cash App, along with an acute number of survey respondents (n=39/350 [11.1%]) who reported being unbanked. One respondent disclosed "my original Bank of America got garnished, so I no longer have a bank and with this [Cash App] debt collectors can't touch my account." The conceptual experiences of traditional banking surfaced several ways in which interview participants and survey respondents compared Cash App to bank accounts. Participants like P12 spoke of her experience and decision of being unbanked, stating "I know a lot of African Americans, myself included, are generally not trustworthy with actual banks, and this would actually stem from a lot of different reasons." P9, contributed to this conversation by stating "people aren't going to bank anymore.. and even though you may be limited with options not typically available, aspects like the Cash Card (debit card by Cash App) is a way for Black communities who don't trust banks with their money, a way to keep control... I have family members who still keep their money under a mattress, the card replaces that." Even with the certain tangential implications like lack of some traditional banking aspects (P12) and limited customer service (P3), participants like P13 shares "The fact that they [Cash App] don't have to comply with certain things that banking institutions under FDIC have to, but yet their services are definitely superior to those institutions, says a lot. Furthermore, out outlined by participants and respondents the fin-tech platform provides space for lower barriers (P20) to entry for actively investing in stocks (P13) and cryptocurrency (P5, P7), in which many traditional mobile-banking solutions lack (P12).

### Valuing Flexible Time: Immediacy around Fintech Use and Management

Several participants shared that they did not have time to wait for financial services and that they value the app's expediency (P3, P4, P10, P13, P16). As P16 explained, "I think most important for me is the immediacy. So, if I am banking with PNC, and the person

who I am trying to transfer funds to is with Capital One, right, that there can leave a delay. I'm only trying to pay you $12 dollars and it's going to take you two days to get these $12 dollars, right?. So, I felt that was... it just seemed unnecessary to me. ... I love that when I hit the 'pay' button, the person who I am paying, it pops up on their screen as it pops up on my screen." P16 appreciated the immediate and transparent quality of the financial transfer enabled by Cash App. Emphasizing this immediacy, participants (P11, P18, P19) and survey respondents alike shared that they "can't affording to wait" and "don't want to wait" (P19). This fear of waiting communicated how detrimental waiting on funds could be to their livelihoods and those of other minoritized, economically disadvantaged persons. This concern was prevalent among participants and respondents residing in rural communities with limited physical financial institutions. For example, P14 grew up in rural Mississippi and explained, "there wasn't a bank or ATM within 30 minutes... Walmart was maybe 30 miles away, so I have family members who didn't drive... so how would you get money fast." For vulnerable, low-income African Americans, waiting for financial resources has serious consequences as exhibited by P14, who explained: "In Black communities, which is sad to say, especially in the South, it's difficult for the majority of people to just get necessary access to small things." One survey respondent further reported that "with Cash App, you don't have to hassle to wait for the money to hit your bank or fees for transfer money out earlier." This concern for fees contrasted with institutional costs associated with transferring peer-to-peer funds, which stood out to survey respondents as a significant burden (6.8% — n=24). Participants like P12 attributed the impacts of waiting to harmful banking practices like overdraft fees, stating "I know I'm not going to overdraft with Cash App... you don't even have the option to. But when I did traditional banking, that always happened, even when I asked them to turn it off." From concerns for over-drafting to logistical hassles, participants noted the importance of timely transactional activity. Immediacy became a safeguard against financial debt and added stress.

### Value of Flexible Banking Location: Financial Deserts and Geographic Constraints

As mentioned in the previous sub-section, many participants (P3, P7, P12, P14, P19) described the legacy and lived experiences of residing in banking deserts — geographic gaps associated with having inadequate access to banking institutions, often situated in low-income communities of color, and frequently resulting in high transactions costs for basic financial services [200]. These reflections foreshadowed the importance of having control over the transactional locale, a locale that had to do with both where someone conducts the transfer and where they transfer the money to.

P11, a busy father of five children, explained how when he was in college, his father was the type of man who would use Western Union or MoneyGram, services known for their predatory lending practices. "He would have to come into the city. And he would have to hop on the train and come all the way to Brooklyn from Bergen County because that's where he worked to bring me money... So, I think about that in context of how easy it is for me to send money to my children now and I'm grateful." Participants like P11 described feeling an increased sense of agency while using Cash App, including being able to support themselves, their families, and communities in meaningful ways. This sentiment expanded the degree to which participants saw themselves as able to grow economically and beyond their geographic constraints.

Similarly, P19 explains, "Two weeks ago, my family, we wanted to go to Atlanta, and we wanted to go to one of the Braves baseball games. And so instead of all of us going in and paying for our ticket, one of our family members got a very fair [priced] ticket through a friend.... And she said, 'Okay, look, we got the tickets on hold for an hour. Can you all meet me to get your money or however the case might be?' And we was like, 'We can't meet physically, but if you've got Cash App, we can send it to you,' and she was like, 'Yes.'" Moments like this one, where P19 is navigating challenging logistical constraints,

speak to common concern for the difficulties associated with spatial segregation—including "saving time, frustration, and financial resources," as P11 explains. When P11's eldest child suggested fin-tech, was "all for" it. "She [P11's daughter] needed money more often and I remember her saying 'just download Cash App,' when I told her that I couldn't leave work to send her money," he explained. Reflecting on geographic constraints involved recognizing less visible contingencies. Challenges like stress, gasoline and transportation money, and a lack of free time (e.g. work schedules, availability, single-parent responsibilities) meaningfully shaped participants' financial activities and fueled an interest in Cash App's flexible, on-the-go money management.

### Approaching Social Media Marketing with Intrigue and Caution

Both survey respondents (n = 35) and interview participants (P4, P6, P7, P11, P12, P18, P22) (10/15 participants) described social media—particularly Instagram and Twitter (P3, P5, P7, P18)—as having a direct and active influence on their use of Cash App. They described engagements like the weekly monetary sweepstakes called "Super Cash App Friday" or #CashAppFriday, sponsored by Square, Inc., the parent company of Cash App. To enter, users comment their $Cashtag (username) under a post or thread for a chance to win various amounts of money; Cash App then deposits the money into winning users' accounts. Participants also shared that they entered into a number of monetary giveaways that Cash App sponsors and markets in partnership with influential Black celebrities like Megan Thee Stallion, Cardi B, and Lil Nas X (P4, P7, P11, P12, P18). Across these reflections, some participants (P3, P5, P19, P20) suggested culturally relevant marketing as an impactful tactic through which Black communities engaged with Cash App on social media. "I feel like Cash App has tried to market to Black people in a way that I would say Venmo and Zelle have not," P20 noted. Echoing arguments by media scholar André Brock [201], there were moments of elaboration among participants; sharing "the way that those ads were written and the way that they circulated through Black Twitter, made it seem like it was for Black

people (P20), along with "I've never see them [Cash App] using any white people, honestly, like Ariana Grande or anything, to boost their app usage or any of the giveaways" (P3). P7 even shared "I've heard the name 'Cash App' in a bunch of lyrics,' unsurprisingly to her mostly by Black hip-hop artists. And while these targeted campaigns were intriguing to some, others (P11, P20) felt more skeptical of the campaign's aims and worried about the safety of their accounts and public perceptions. P21, for example, disclosed never participating: "I watched that stuff. I never do it because I'd be embarrassed to enter giveaways like that." Perceptions of falling prey to false promises of Cash App and fin-tech shaped participants' perceptions of social media. When combined with money attainment, social media was met with interest, but also caution among participants. As P19 expresses, "I think just like any marketing play Cash App is using influencers to push an idea: trust and building some loyalty, establishment, and credibility to really engage the people [African Americans]." But this premise is countered by a number of participants (P5, P7, P9, P12) who described experiencing harms through Cash App, like P9 whose account had been "hacked," resulting in him losing funds: "there was a time I had a dispute with Cash App and it was very hard to get customer service. You had to email them [Cash App], and it didn't get resolved. I've never seen anything like it." Similarly, P7 shared "Cash App robbed my friend and took their money out of their bank account... I disconnected my bank from the app so it wouldn't happen to me." While perceiving culturally relevant social benefits (P20, P5), participants also recognized the faults of fin-tech. As stated by P16, "Any technology could leave people more vulnerable." This statement highlights the awareness of participants as users of a platform like Cash App that seeks to simplify the way people send money, spend, bank, and invest.

### 3.4.2 What fin-tech design decisions support the economic development of African American communities?

Participants described specific aspects of Cash App that reflected their daily needs and lifestyles as African Americans. Cash App features like the easy-to-navigate interface, minimal layout design, and corky notifications granted participants moments of delight, time flexibility, and educational attributes. P13 noted that Cash App's ease comes from its "three step process" in peer-to-peer transactions (P19), which includes "adding money, sending money, and receiving money." The features include controlling who has access to their transactions (P5), providing access to card information without physical cards (P12), delightful notification sounds (P3), immediate transfers (P16), transactions within geographic constraints (P19), and budget notifications (P18). Below I examine these design decisions in more depth and consider their relationship to increased financial agency and development among African American communities.

#### Simple but Safe Access

Several participants (P4,P5,P10,P11,P14) described "simplicity" (P5) as a notable feature of Cash App. P11, a veteran and father of five, put this quality succinctly, "The interface is easy. I love the fact that it always allows me to get access to my Cash App card number because there are times that I use it. They may want an Instacart order, and I never leave my credit card in anything. I have one mischievous son that will charge shit." P11 wanted seamless access to his account while making the account harder for his close kin to access without his permission. Similarly, P7, a 22-year-old college student, shared, "I use it [Cash App] to pay for certain things I don't want my parents seeing in my [bank] account," as Cash App allows sole users access to accounts ($Cashtag) not shareable with others. Participants then have control over their privacy, which builds trust and loyalty to the app.

Participants like P11 emphasized the importance of ease alongside personal privacy. In

the case of P12, a gig-worker and caretaker of three, the app's convenience came when making purchases anywhere despite being constantly busy. "You have your Cash App card on you or you have the app on your phone, which has a little display area to show you the front and back of your virtual card if you don't have it physically present. I guess it makes people[,...] African Americans, minorities in general, feel safer using [financial services] online. It offers a better type of convenience." This "better" mode of convenience spoke to a certain pairing of smooth access with feelings of personal and financial security. This convenience also speaks to how safety could be relevant to the participants' neighborhoods experiences (P12,P18). P16 shared, "It [Cash App] helped to mitigate the risk of swiping my card or taking cash out of my wallet in a community where people are in need, or people are desperate, and they might make harmful decisions." This reality was common among participants, but especially those who indicated they lived in low-resourced or economically disadvantaged localities (7-participants; P8, P12, P11, P17). For instance, P12, who's a middle-aged mother of 2 young children, shared the effect on her family in the West Side of Chicago, IL, stating, "a lot of things happen, like burglaries, well, robberies. You know just anything. So, I know they feel safer using Cash App, getting the convenience of having 'cash-on-hand,' without physically having cash, especially in the area."

Maintaining control over both privacy and safety was important to, and carefully considered by, participants (P13, P16, P19). When comparing features with competitor financial service apps like Venmo, participant P13 cautioned that "the share feature, I never use that because it's like okay I don't need to share with someone what I'm using my finances for. It's none of anyone else's business." This participant is referencing Venmo's public social feed that optionally displays users' transaction descriptions as a default setting [185]. In contrast, this participant appreciates Cash App personal privacy features. As P13 explains, "Cash App puts it all in your hands and allows you to pretty much oversee your own handling of your financials." Ultimately, participants like P13 valued affordances of user control privacy of their financial activities.

When exploring general motivations for controlling fin-tech privacy and safety, participants' attributed observations that stemmed from a legacy of inconveniences (P14, P16) and even disparities (P11, P13) for African Americans. P13 expresses: "The culture around Cash App probably appeared where people are tired of waiting for the banks. The lines just got ridiculous quite frankly." This anecdote is one that underlies several participants' shared experiences and perceptions of consequences associated with not having desired financial control (P13, P19). As P14 shares, "In 1958, when a Black person wanted to open a bank account, they were ignored, not allowed to walk in, or simply denied at the door. If putting our money in the bank is a whole lot safer compared to other circumstances, how could they [African Americans] grow wealth if they were going to be denied at the door?" I see through these observations, participants were cautious, reflective, and reactive to their financial privacy and safety. As P13 puts it, "no one really wants someone else to control your money or have control over your own finances, unless you absolutely need somebody and that's okay." He further elaborates on the affordable potential of emancipatory design elements in fin-tech stating, "I think for the most part, the culture of use among Black people came with them wanting to have control of their own finances, wanting to take control of their own futures and their own success and benefits" (P13). His claim echoed other participants' desire for simple but selective control of banking, beyond trivial accommodations (P10). With this desire, participants actively worked against an uneven tradition of banking tied to structural racism [202].

### Moments of Delight

While participants emphasized the significance of Cash App's simple but safe access, they also appreciated more ineffable qualities of the tool that sparked moments of amusement, satisfaction, or delight. P3, who regularly uses Cash App to pay for haircuts, spoke about the importance of tips: "I think it's also easier to just put [tips] on Cash App because I tip a lot as well. And so, it's easier to just kind of give them the tip on there, and then they can

like it back." This participant appreciated that the Cash App interface not only made tipping visible, but also allowed for some reciprocation on the part of the hairdresser or person tipped. This presented opportunities for expanded economic participation, but also at a micro-level, prompted support of local economies more easily. As P14 observes, "having that [Cash App] equipped access to definitely help out small black-owned businesses." Nearly all of the participants emphasized that Cash App plays an emerging role in Black businesses, from starting them (P20), to sustaining them, to garnering support for them (P12). Participants were delighted with the expanded opportunities to uplift Black commerce, reinforcing pride and community-driven agency (P11, P16). Congruently, participants approved of Cash App affordances that allow them to support acts of charity (P13), religious giving (P18), and mutual aid (P20) within their communities. As expressed by P16, "so, Cash App does kind of support clandestine (under the table) activities in ways that me writing a check and being able to say 'well, how was that money spent' doesn't." Participants were seemingly happy to meet their fellow community members where they are by grounding their giving through channels that work for those in need. For example, P9 expressed, "I may not distribute funds through a GoFundMe because I know the service takes a pretty good percentage of what people have raised... I'd rather Cash App and say 'hey, here's X amount of dollars toward your cause' because I know some Black people can't afford to wait or lose any monetary support." As P16 put it, "to be able to do that and drop a little something over Cash App has a great impact (P18) on the Black community." Across the participants, I saw them associate seemingly intangible aspects of interaction with Cash App with momentary cultural delights with fin-tech. At other times, participants appreciated the gamification of sound notifications within Cash App when engaging in financial transactions. P3 explains "when you receive funds and your sound is up, it [the mobile push notification] sounds like money is dropping down from just anywhere. So, I think that may be like a trigger or something, just making you think you're doing something good, or just a reward aspect of it." For participants like P3, the small allowances for reciprocity and musical adaptation of

coins dropping in a bucket could associate meaningful experiences of happiness and pleasure through Cash App. Triggers that may have been designed as simple notifications seemed to offer the hope of a financial reward in one's Cash App account. This hope could further incentive participants and users to engage with the platform in ways that they hadn't with traditional banking technologies.

### Tracking and Visualizing Financial Activity

Participants who described having traditional bank accounts indicated that they used their accounts to cover serious and static expenses such as bills (P12, P20), utilities (P16), and tuition (P16), whereas they used Cash App as a tool for keeping track of financial activity and visualizing discretionary income, particularly for dynamic expenses they needed to budget for. This activity involved interacting with Cash App's record of their spending over the course of the month (P16, P18). P16, for instance, spoke about being a single mother of two, seemingly earning a livable wage, but somehow still not achieving her ideal financial autonomy. She first explored different budgeting strategies like the "cash in envelope" method (where someone seals an envelope with cash inside to encourage saving). But they did not work. Something like the envelope method didn't contribute to her consciously knowing the state of her funds. She explains "I love that on Cash App, it's going to text me and tell me like, sis, what is you doing? I love receiving that notification at the restaurant, like okay, we shouldn't have gotten appetizers today. And knowing that that's coming... So, my bank account knows what happened and then Cash App knows what happened and then it's in text, so it's like I'm never out of reach of my financial information, which I enjoy a lot." Finding those approaches unsustainable and unsafe, participants like P16 appreciated the transparency around Cash App transactions where the app offers a consistent overview of their financial activity.

When asked how Cash App helps balance their finances, P22 spoke about notifications related to transactions. "I like the fact that it does tell you what your balance is. It tells

you where you're getting the money from. It'll do that in a redundant manner. Like my Cash App will let me know and I'll also get a G-mail and I'll get a text message. So that would come in handy, if say, other people had access to my wallet. That way I could know if I was getting thieved," P22 explained. Users can set up a notification system on Cash App that aligns with their personal financial goals. Participants described the push notifications alerting them of balance reminders and suspicious activity, making the experience enjoyable as well as useful. Across tracking and notifications, we see participants frame Cash App as supporting increased awareness in budgeting and spending judiciously and intentionally.

### Educational Features Promoting Financial Literacy & Investing Knowledge

When asked about emerging digital platforms, some participants (P3,P11,P19,P20) mentioned desiring features related to education, especially services that might boost financial literacy. P14 explains, "it's sad that I feel like some companies here are extremely lazy with helping their community when they have that opportunity to, but I feel like with Cash App, I feel like they really want to start off with something. They could actually come out with a whole tutorial, like you said, on how to trade stocks, how to finance your money." This participant was familiar with Snapchat and described enjoying the ability to swipe to the end of a story. Within a fin-tech context, they imagined getting a daily episode of how to save your money, how to process transactions, and how to keep up with bills. "Just small things like that, that can teach people's finance," P14 explained. Other participants (P5, P10) discussed looking into stock options and findings a section of Cash App with resources for learning about cryptocurrency and stocks and breaking down how they work. Resources like these—some built into the app and some imagined or referenced in other services—underscore participants' strong interest in fin-tech applications providing educational scaffolding around financial literacy, a theme I expand on in the next section.

### 3.4.3 What role do users see emerging mobile fin-tech could play in supporting increased economic agency and financial inclusion for African American communities?

#### Community-Centered Use: Engaging Cash App to Support Black-Owned Businesses, Giving, Transactional Communities

For some participants (P12, P14, P16), the use of Cash App for particular civic and community-centered uses took precedence. From supporting and buying from Black owned businesses, to supporting community-driven giving, participants described Cash App as a significant tool for circulating wealth within Black communities. P16, for example, shared, "Cash App has definitely made it easy for me to support Black people. I trust Black people, right. So If I'm at a festival and Sis is selling t-shirts that she made out of the back of her truck, I love her, I trust her, I want one of those shirts, but I also don't want to share my credit card information... Cash App allows me to buy that shirt right?" Similarly, P13 described that Cash App as a not only a practical means of payment within his family-run business, but also a way to support other Black entrepreneurs "when I'm out in the community." Purchasing common cultural consumer goods like shea butter, waist beads, and rib plates (P16), or buying lemonade from young Black girls at a stand (P16), allowed participants to support Black economies within their own communities, facilitated through a platform that seamlessly allowed them to transact without averting their gaze (P16). This sentiment reflects a broader concern for communal responsibility that I observed across the interviews and suggests opportunities for fin-tech to support increased access to Black businesses.

#### Customer Service: An Advantage or Obstacle

Now that financial transactions could take place anytime and anywhere, several participants (P3, P10, P12, P13, P16, P22) described facing new and surprising hurdles connected with customer service. Participants expressed difficulty finding someone or something accountable

for minor errors, missing money, or general customer inquiries. For some (P12, P13, P22), this experience involved not finding contact information or a human customer service agent. For others (P3, P10, P16), the service experience involved losing money and not knowing who to contact or how to recover it. P3 described waiting three weeks after someone sent them $300 and the app "flagged" the money, refusing to complete the transaction. "[The money] kind of got lost in the system," they explained. When P10 tried to send money without success, they received notice that they should wait 24-48 hours for their complaint to be processed. "At first I found it to be, it was a task." Echoing fears of systemic exclusion associated with banking, P18 explained, "The problems we face with the cashier, and some banks, they have poor customer service. They won't take the time to attend to you and probably just poor customer services." Expectations for accountability remained low among participants, but they still wanted to hold the app accountable when something went wrong. As P11 noted, this kind of accountability "wouldn't be able to happen in the fin-tech space because the fin-tech space is for profit." Ultimately, participants' experiences suggest customer service acts as a filter for financial services, shifting attention away from education and knowledge sharing and toward the management of profit.

### Bridging Financial Literacy & Economic Knowledge Gaps

Across the study, participants pointed to a unique opportunity for fin-tech to bridge gaps in knowledge for financial literacy and economic development. P16 described working with undergraduate students who are active users of Cash App and other mobile fin-tech. Recalling the danger and risks associated with launching these platforms, especially among those who have limited exposure and experience to financial literacy, he explained: "There's definitely a base level of financial literacy that is needed for you to be able to mobilize it (Cash App) in your own interest... and if someone like Black college youth doesn't have that, then Cash App poses the same risks as the Victoria Secret credit I mis-managed as an undergraduate myself." Participants like P16 observe limitations around financial literacy and lack of

generational wealth knowledge that underlie additional barriers for not only understanding economic activity, but also experiencing financial prosperity, or what P16 called the "American dream." Whether effective money management or investment knowledge, participants saw Cash App as a site for financial education. P14 described his experience growing up in rural Mississippi as a descendant of enslaved African Americans: "my ancestors were seldom given or most likely never had access to take advantage of literacy, let alone financial literacy and investing knowledge... even today, I would suggest that 70% of people in my father's family do not have stocks. It's not because they were never interested, but just that they were never exposed to it. They may see it on the news. They can see a red or green line on a graph and that's it. They just move on, because they're, a lot of times, just not educated in that factor." He further suggests that fin-tech apps like Cash App "have been able to build wealth in the Black community, just off small measures, like better interfaces" that are interpretable, explainable, and expose economically disadvantaged communities to financial content. Participants like P16 mentioned a range of skill sets critical to financial literacy, from management of stocks and cryptocurrency (P5, P10, P11, P22), to knowledge required to start and grow a business (P16), to knowledge related to sustaining wealth (P14).

In parallel, some participants (P3, P5, P10, P14) saw an opportunity for fin-tech to support cross-generational mentorship within their communities. P11 shared that his eldest daughter introduced him to Cash App. Similarly, P3, a 23-year-old college grad explained: "I kind of put my parents onto it, just when I left home for college and everything and they wanted to send me money fast without having to use the banks and everything." Additionally, P10, a 40-year-old gig-worker observed older members of his community, often those who were "less computer savvy", having a hard time trying to use Cash App and needing support from younger family and community members. Conversely, P14 learned to manage finances as a child, when their ninth-grade teacher took time out of the school day to share basic techniques. Regardless of age, participants like P3 and P14 saw the value of using fin-tech services like Cash App to respond to difficulties acquiring financial

management and technological skills. As P14 observed, "some kids probably would never even receive that information from their parents [...] So I feel like starting off with online banks like Cash App [...] that would be a starting point." Using Cash App became a stop gap within a financial legacy long depleted of resources. Aiming for a different future, participants described using the app to invest in early financial and technical literacies within their families and communities.

### Black Cultural Influence and Peer-to-Peer Support

Several participants viewed cultural influence amongst Black community members and peers as paramount in onboarding new users. From family (P18), friends (P4), neighbors (P18), and supporting Black businesses (P10), participants shared that their use of the platform stemmed from its popularity among Black people throughout their communities. P14, who is currently a graduate student, spoke of his experience as an undergraduate student at a Mississippi college, where his motivation to adopt Cash App stemmed from his Black friends. "The majority of Black people, it was just like I knew they had Cash App compared to my white colleagues, who mostly used Venmo. It was a standpoint where I knew that if I wanted to send my best friend who is Black money, they would more likely have the Cash App than Venmo, so I kept Cash App because continuously, majority of my friends had it." Similarly, (P20) who was a recent college graduate from a PWI (predominately white institution), shared 'when I say Cash App to white people, they'd be like 'you mean Venmo?', but when you're around Black people, everyone's like 'Cash App me.' I'm not sure why Cash App was the 'Black people's app,' but it does seem like that stereotype holds up pretty true." Participants consistently shared that Cash App was a tool regularly used among their community, with one even stating "I think it's kind of a normal thing over here with the Black American community... They make use of it, and they talk about it. That's what they use on a daily basis to send money, to do transactions, to receive and send money for their business" (P18). When asked about motivations that may have prompted the

adoption and on-going use of the app by African Americans, participants attributed aspects like traditions of mutual aid, sustaining informal economies within Black communities, along with accessibility of the platform.

## 3.5 Discussion

The findings have so far pointed to a variety of ways that African American community members come to learn about and use Cash App. Participants saw fin-tech as an emerging form of social media, with important implications for their exposure to economic development opportunities, access to ways in which the community can support and sustain themselves, and introduction to financial literacy programs that bolster a sense of financial inclusion and well-being. Their reflections suggest fin-tech applications like Cash App enable increased connection to small Black business, with potential to scale support across communities.

But despite these benefits, participants also noted several challenges to financial accountability and sustainability. When it came to the user interface, participants tended to emphasize the value of synchronous visual tracking of financial activity and customized widgets such as musical notifications. But they also lamented not having additional tools for financial education and community support. Others noted hurdles to reaching customer service agents and finding money that disappeared during a routine transaction. Within these challenges, they recognized financial exclusions as activated by Cash App's participation in a longstanding process of extracting social and economic capital from Black users (known as racial capitalism [167], see above). Recall P11 who noted "the fin-tech space is for profit." As fin-tech scholars like Bill Mauer and Lana Schwartz describe, tech innovation in something like Cash App is a matter of addition and not progression [203]. Just as participants emphasized the necessity for accessing services on time and in place, they opined those particular experiences impeded participation, including navigating hidden costs and unwanted financial risks.

### 3.5.1 Open Questions and Opportunities

Looking beyond these immediate concerns, I end by considering opportunities for design scholarship to strengthen community education and bring empathy (back) to financial services. I summarize these lessons around themes of communal trust and assets-based fin-tech.

#### Beyond Legacies of Distrust: From Trustworthy Features to Communities of Trust

Notably, participants described turning to Cash App to avoid the financial institutions they distrust, including traditional banks. But when it came to digital financial services like Cash App, they did not attribute trustworthiness to the application design. They were less interested in finding the application's features trustworthy and more interested in the communal practices of financial support that allow those features to work for them. A concern for trust shifted from the financial services to communities around them. Like prior work on ride sharing [204; 205], participants found additional forms of gatekeeping in their interactions with Cash App customer service personnel. This observation reflects a concept of "community-cultural wealth" [206; 207] that speaks to shared communal and cultural attributes. Recalling several participants' use of Cash App to support their family members, we observe the need for additional avenues for communal financial care. This support might take the form of community-centered collaborative platforms for formalizing networks of skill sharing, knowledge attainment, and mutual aid. It could also take the form of collective action platforms that organize campaigns for influencing policy around wealth redistribution such as Black reparations [208; 209].

#### Operationalizing Community Culture: Assets-Based Fin-Tech

Returning to the topic of asset-based design potential, several participants emphasized the importance of elevating already thriving forms of community financial support. As design

scholar Ahumada-Newhart and colleagues [164] remind, HCI and design researchers should recognize "the importance of industry and academia self-reflection on their organization's role in the marginalization of communities in addition to valuing the lived experiences of marginalized communities." Turning to fin-tech, I intentionally shaped this study around the lives and experiences of African Americans with Cash App, a tool with wide adoption within Black American communities. Where assets tend to refer to a group's social and cultural strengths within design literatures, assets tend to refer to economic resources like money or stocks within financial contexts. Putting social assets in conversation with financial assets, the study draws attention to the economic and cultural entanglements underlying participants' everyday transactions. This observation means recognizing how seemingly intangible capacities such as knowledge, skills, values, draw attention shape tangible capacities reflected within participants' everyday lives such as visible financial traces through platforms like Cash App (see [210; 194; 192; 79]. With their reflections, the participants pointed to a particular form of assets-based fin-tech: a process of shifting from deficit-based views to asset-based community development (ABCD) around digital financial services and acknowledging the varying forms of cultural, social, and aspirational capital that inform those development goals. This shift toward a fin-tech services grounded in community resilience challenges for-profit services such as Cash App to consider supporting lasting pathways for African American users of fin-tech to make key decisions around financial services platforms development and use. Applying an assets-based lens to fin-tech means prioritizing new forms of advocacy and democratization that elevate individuals' and groups' situated capacities [80], help users manage financial risk, and reckon with the historical implications of marginalization [17].

Alongside this focus on connected financial and cultural assets, I follow Wong-Villacrés et al.'s concern for assets-based HCI [79] to ask: what positive changes could assets-based fin-tech bring to Black American communities who have continuously resisted and persisted through inequities in economic development? Addressing this question means prompting

design scholars to redefine the "community" to which asset-based development typically applies. ABD's origins in community development and education reveal a focus on hyper-local framings of community that are primarily rooted in geographic locality. This framing presents limitations to the applicability of "community impact." By situating identity-based communities as appropriate sites of application and intervention for assets-based community development, I urge HCI and interactive design scholars to broaden the scope of their inquiry. Looking forward, positioning financial assets through a culture-in-action lens [79] situates collective strengths against the backdrop of structural limitations [180] and enriches HCI analysis of community capacities in design. Additionally, HCI scholars like Sheena Erete et al. (2018) have turned to Intersectional HCI [211; 116; 147] to highlight the importance of researchers to develop a shared understanding of the problems that are relevant to a community [45]. They position intersectionality as a design framework that "considers the various backgrounds and personal experiences that shape the lives and outcomes of marginalized populations, defined by factors including but not limited to race, gender, and class" [45]. This concept suggest that people have unique experiences based on the combinations of their identities, making it impossible to understand discrimination and oppression, especially when institutions have used identity to marginalize some and privilege others. I introduce this lens as an aim to intersect principles of advocacy, embodiment, and self-disclosure in fin-tech design for intersecting identity groups like Black Americans. Efforts to understand and recognize situated capacities of such communities, may contribute to more ethical [212; 213] and sustainable outcomes [214] of technology design.

### 3.5.2 Methodological Reflection

Research designs are the specific sets of procedures and epistemic attitudes that define the implementation of qualitative, quantitative, and mixed-methods approaches [198]. The research design in the study discussed here leveraged mixed-methods research approaches in the data collection, analysis, and interpretation of the research questions outlined for investiga-

tion, which included surveying, diary study, and semi-structured interview. Mixed-methods research approaches often take a pragmatic worldview, where the researcher can traverse post-positivism (quantitative), constructivism (qualitative), and even transformation (qualitative) in their interpretation of a research problem [198]. Within HCD, qualitative, quantitative, and mixed-methods research approaches can all be used, and in this section I will elaborate on my choices in the approaches outlined in this study.

I used the survey not only to screen eligible participants, but also to collect data on their demographics and responses to quantitative (likert scale, frequency, yes/no) and open-ended questions about their Cash App use. This method was useful in that it allowed me to broadly view and filter the participant pool and make generalizations about them. This is often the first step in mixed-methods research studies, and for me, it was vital because I wanted self-reported participant data for this phase. However, this approach can be limiting, in that largely quantitative surveys are only able to capture acute information from participants, data that lack the complexity and contextual detail of qualitative data. In my case, this was evident because some questions were simply included to verify that participants would be a "good fit" for the subsequent study phases. Elements of the survey, including how often they reported using Cash App, what tasks or actions they performed with the application, and whether they had traditional personal bank account(s), were used to make assumptions and generalizations about the participants as fintech users. While the responses were essential for context-setting for me as the researcher, they were not in-depth enough to make claims that I was confident in. As an HCD researcher, I am compelled by human behavior and stories as research evidence. Thus, my next 2 methods were the core instruments for investigation.

The diary study approach was used as a method for mixed qualitative and quantitative inquiries, in which participants were asked to document their daily interactions with the Cash App and provide detailed accounts of their activities. This method primarily informed Research Questions 1 and 3 by evaluating the specific actions taken by participants within the application and their underlying reasons. Given the longitudinal nature of diary studies,

this approach proved effective in capturing user behavior over a 30-day period, facilitating the establishment of baseline rapport and participant engagement through weekly interactions. Additionally, it provided valuable context regarding participants' economic activities and experiences with the app, which informed the semi-structured interview phase. However, diary studies are inherently limited in scope, capturing only snapshots of participants' experiences. Despite the 30-day duration, the context remained restricted, particularly if participants did not frequently use the platform during the study period. A more extended longitudinal study spanning several months or years could have yielded more comprehensive data. Furthermore, the highly engaging nature of diary studies, which required multiple weekly submissions for compensation, affected participant retention, with some withdrawing completely. One submission highlighted that a participant's manual labor job limited their phone usage, suggesting that such studies might disproportionately challenge individuals in blue-collar professions, potentially marginalizing underrepresented and vulnerable groups further.

The final approach used in this study was the semi-structured interview, a qualitative method designed to gather insights through a series of open-ended questions. This approach was grounded in theory, with the lived experiences of participants informing Research Questions 1, 2, and 3. Conducted by my research team, which included five other HCDE student researchers of diverse racial and gender identities, the 1-hour interviews with individual participants and two researchers were guided by a script developed after the survey and diary study phases. This allowed us to pose targeted and intentional questions, benefiting from the established rapport with participants, many of whom viewed this phase as the capstone of their involvement. The interviews enabled flexible dialogue, with researchers often adapting questions based on the conversation's progression and participants' responses. Notably, compelling statements about fintech use prompted further investigation into the phenomena at hand. However, interviews, while a leading method of inquiry, have inherent limitations. The individualistic nature of interviews affects the context and quality of data captured, with par-

ticipants often framing their experiences from the perspective of a Black/African American community member. This sometimes led to broad assumptions about the African American fintech user population and conflated personal experiences with those of the broader community.

During the analysis of video recordings and audio transcripts, a notable trend emerged: participants shared less detailed context with non-Black research team members compared to Black researchers. Of the six team members, three identified as Black. The scheduling of interviews based on researcher availability and participant preference resulted in varying racial pairings of interviewers. Despite participants not knowing the racial identity of the research team members beforehand, it was observed that interviews conducted by Black researchers were longer, more detailed, and included more moments of camaraderie. This could be attributed to the sensitive nature of discussing finances within a community historically underrepresented in this area, where participants appeared more at ease and trusting with visibly Black interviewers. This observation suggests that researcher identity can significantly influence the data obtained, raising important questions about the conduct of qualitative research on sensitive social topics by researchers who do not share the participants' social identity. The implications of these findings challenge the methodologies of social justice-oriented HCD research and prompt consideration of whether an all-Black research team might have yielded even more nuanced data. This reflection invites broader questions about the impact of researcher-participant identity alignment in studies involving underrepresented or vulnerable social groups.

An important takeaway is that pluralistic and universal user-centered design methods — whether quantitative, qualitative, or mixed—can be mismatched when interrogating and making claims about transformative social justice phenomena for certain underrepresented and vulnerable groups. Research methods scholarship has indicated that incorporating social justice theories into mixed methods research with a transformative worldview presents specific challenges for researchers, including understanding what constitutes transformative

social justice and how to embed a transformative framework into a rigorous, sophisticated mixed methods study [198]. Additionally, a transformative mixed-methods framework entails a set of assumptions and procedures that guide the research process [198; 215]. Such a framework relies on underlying assumptions that prioritize ethical stances of inclusion and challenge oppressive social structures. This approach necessitates an entry process into the community that is designed to build trust and make goals and strategies transparent to all stakeholders. Furthermore, it emphasizes the dissemination of findings in ways that encourage the use of results to enhance social justice and human rights. These components are crucial for ensuring that the research not only adheres to rigorous academic standards but also contributes meaningfully to addressing the social justice issues it aims to investigate.

With these considerations in mind, it becomes evident that HCD research methods that do not incorporate a transformative and inclusive perspective tend to produce tenuous research claims and do not adequately address social justice challenges relevant to individuals facing discrimination and oppression based on race/ethnicity, disability, immigrant status, political stance, sexual orientation, financial insecurity, gender, or age [216]. This insight has significantly influenced my approach to applying HCD methodologies in my research on Black/African American populations and other marginalized groups. Throughout my dissertation work, I emphasize not only the mechanisms of research methods, but also the theoretical foundations that underpin my inquiries. As suggested by social science research methods scholarship [198; 216], integrating social justice with technology design necessitates embedding social science theories into research inquiries, methods, and procedures to arrive at evidence capable of influencing transformative social justice.

This integration often involves placing the theory or conceptual framework at the onset of the research study design or article as an a priori framework to guide the research questions or hypotheses. It also requires explicitly naming the theory used and describing how it informs both the quantitative and qualitative components of a mixed-methods study. This includes explaining the major relationships among variables in the study and discussing

previous studies and literature that have applied the theory in contexts related to the current research topic. Furthermore, accompanying scholarship with a lineage analysis or diagram of the theory to illustrate the direction of probable causal links and the main concepts or variables could be valuable to readers in drawing concrete understanding. The theory thus provides a comprehensive framework for both quantitative and qualitative data collection efforts. Finally, the theory is revisited at the end of the study to review its influence on the findings or results. This structured approach ensures that the research is methodologically sound and theoretically informed, thus enhancing its capacity to address complex social justice issues effectively.

### 3.5.3 Limitations and Future Work

I learned from participants with a range of experience around financial services (broadly) and Cash App (in particular). But there are aspects of the study design that limit the applicability of findings. A first limitation of this study involves the focus on people who use mobile fin-tech applications, as opposed to those who participate in the design and envisioning of said applications. I sought to focus on consumer users due to their direct engagement with Cash App as a fin-tech and their lived experiences of the platform's impacts. Additionally, these users contribute grounded-truth reflections that could grant insight for pathways toward more equitable fin-tech design broadly. But choosing this lens to focus on users, risks overlooking the role and responsibility of fin-tech designers as they navigate tensions around for-profit banking, equitable practices, and community-centered agendas. Future work might address this gap by expanding the participant pool to include designers and investigate their current design practices, considerations for impact on historically marginalized people, and outlooks on opportunities for more equitable fin-tech. A second limitation concerns the focus on current Cash App users, rather than non-users, or former users. Future work could include follow-on studies to explore wider patterns of use, which would enable a deeper assessment of unwanted financial harms and surprising benefits introduced or sustained by fin-tech. A

third limitation concerns the recruitment approach and participant sample. In recruitment, though I was successful in reaching a diverse array of participants, there is still opportunity to recruit an even wider audience through expanded methods. The decision to recruit primarily through online, messaging, and social media channels, present limitations to eligible participants who reside offline. In addition, the hybrid approach of recruiting through community organizations was limited in its impact, as this practice is focused hyper-local to residents of the city in which the research team was based. I lastly recognize that the participants selected for this study do not holistically represent African Americans' Cash App use, writ large. Instead, they speak to a diversity of experiences among African American Cash App users that meaningfully expand existing fin-tech analysis for Black communities. Future work might focus on survey data to identify broader trends or incorporate more localized study methods for exploration of community-based agendas.

## 3.6 Conclusion

The study described in this chapter contributes one of the first in-depth HCI and design studies of fin-tech among African American users. To understand the values, circumstances, and priorities motivating use of mobile fin-tech, I conducted a mixed-method study with African American users of the mobile payment platform Cash App. The study included an online survey, a 30-day diary study with 21 participants, and semi-structured user interviews with 15 participants. I limited the scope to African Americans to amplify and galvanize the need of increased financial inclusion amongst a racial ethnic community that has been historically oppressed and excluded from financial autonomy in the U.S. In the analysis, there are a range of unique experiences shared by study participants as they navigate the economy through financial services designed for increased mobility. The findings suggest that participants persist and navigate contemporary financial systems against the background of social and cultural capacities that are generationally associated with African Americans.

I draw associations of such assets today with fin-tech, as Black communities engage with mobile financial services that increase exposure to economic growth opportunities.

The findings from this Cash App case study provide a wealth of insights for the broader goals of this dissertation, especially towards the development of the Techno-Realist framework presented in Chapter 6. Cash app as a mobile fintech application presents an example of a technological product which has found particular resonance with the African American community, solving culturally specific problems and presenting features which incline themselves to adoption in the context of pre-existing enculturated economic behaviors. This phenomenon is somewhat the reverse of what this dissertation work prospectively and prescriptively envisions, in that the community found a technology solution that happened to fit its user needs rather than have a system designed with community input from the beginning. Nonetheless, understanding the success of Cash app among this population provides an opportunity to "reverse engineer" the relationship between community-specific needs and app-specific design decisions, which can help to inform proactive attempts to design tech solutions within a culturally-relative techno-realist framework.

# Chapter 4

# Advancing Data Equity: Responsibility and Representation in NLP Data Practices

"Linguistic justice advocates for antiracist Black language pedagogy and against anti-Blackness, racial violence, linguistic oppression and white linguistic and cultural hegemony" - April Baker-Bell [217].

## 4.1 Introduction

While the CashApp study presented in the previous chapter provides some insight into how technological design choices can resonate with and prove beneficial to Black users on the basis of enculturated preferences, it is more often the case that technology made for the mass market and with an aim towards universal appeal will *fail* to address the culturally specific needs of minority groups of users. The study presented in this chapter presents a highly salient case of the latter, by looking at the place of African American English in natural language processing (NLP). Language, as a central site of cultural diversity and thus

of culturally specific needs, presents an especially important challenge in an era where many of the most rapid advancements in technology and user interface design concern NLP, and thus direct interface between artificial intelligence systems and the linguistic culture of Black peoples which has historically been a major mechanism of their marginalization.

As language technologies increasingly permeate every facet of society[1], the need for responsible and inclusive dataset practices has never been more critical. Recent scholarship has documented the challenges common to natural language processing (NLP) systems in such as automated speech recognition (ASR), text classification, and language generation [25; 218; 54]. Technologies like smart virtual assistants and GPTs have been known to perform unfairly and exude bias which has stemmed largely from underlying dataset production practices, primarily a lack of diversity in training data and among technologists [219; 220]. In data science for machine learning (ML), dataset production practices encompass various stages, including data curation, collection, annotation, and implementation [221], each of which can be influenced by human-values judgments, including judgements based on implicit biases for and against certain speech varieties.

Data practices can have a grave impact on the AI systems that people encounter daily. Instances of low-income older Americans being denied critical health benefits because of an algorithmic decisions or the pregnant Black woman wrongfully arrested because of flawed facial recognition technology. In response, the HCI community with CHI, FAccT, and AIES have surfaced concerns with the lack of input and participation by persons of underrepresented American socio-cultural groups in NLP data production practices [222]. Community-driven teams like DataWorks have emerged to combat such gaps by supporting data-centric projects, like reviewing thousands of passages of text data to annotate for African American English (AAE). Subsequently, in response to unjust outcomes of data-centric AI systems, policymakers have introduced AI regulatory frameworks and legislation to safeguard against

[1]Article Title: Advancing Data Equity: Responsibility and Representation in NLP Data Practices. Contributing Authors: Jay L. Cunningham, Rock Yang, Kevin Shao and Nathaniel Mengist. (2024). Manuscript under peer review.

sociotechnical harms and foster design practices that are socially responsible [223]. These cases are pivotal in determining the effectiveness and fairness of AI applications which may undermine civil liberties and freedoms.

While previous research [224] has predominantly tackled these issues from broadly theoretical standpoints offering suggestive remediations, there is a significant gap in empirically understanding and addressing the representation issues from the perspectives of the technologists themselves. In this context, I use the term "technologist" to denote any professional engaged in the design, development, or production of a new technology. Technologists' insights are crucial as they navigate daily decisions that influence dataset integrity and, ultimately, the behavior of AI systems [225; 226]. This work explores the range and complexity of these data practices for developing more diversity-sensitive approaches to dataset production. More specifically, I explore technologists' takes on existing approaches to increase diversity, such as having diverse annotators and data regulation. Furthermore, this study seeks to bridge the gap between AI/ML development practices and directives by legislative AI policies. By indexing the perspective of AI/ML practitioners on the applicability and practicality of guidance outlined in the U.S. White House AI Bill of Rights, I expand ideas of "policy to practice" to explore how regulations may safeguard against algorithmic harms and promote inclusive AI/ML data practices.

The study described in this chapter aimed to uncover how technologists can and do influence the trajectory of dataset production toward more ethical and representative outcomes. Concretely, this study explores the following three research questions:

1. What are the perspectives of NLP data practitioners regarding the feasibility of AI policy and regulations to safe-guard against the potential harms of AI?

2. What are NLP technologists' perspectives on involving members of underrepresented and under-served communities in the data production pipeline?

3. What strategies might NLP data practitioners implement within dataset production that can enhance representation and inclusion among underrepresented minority users for NLP systems?

The findings from this study contribute toward a critical and action-oriented framework that addresses the imbalance of power and agency in NLP data practices, promoting a shift toward more responsible and equitable AI development practices. This section presents work that further extends the discourse of sociocultural data integration for intelligent data-centric systems. In addition, it introduces discourse on AI policy to practice, connecting ideals of governance with that of AI system performance and technologist responsibility for improved experiences of under-served user groups. Connecting to the themes of this dissertation, this section contributes to humanistic design perspectives that aim to improve user conditions.

## 4.2 Related Work

AI/ML systems like natural language processing (NLP) profoundly influence our communication, decision-making, and understanding of each other. The integrity and inclusivity of NLP data practices are crucial for improving the fairness and effectiveness of these technologies. Before describing the present study, this section presents a review of the literature on how NLP data practices can support or undermine equity, with particular attention to the diversity of data annotators and the involvement of a diverse range of communities [222; 227]. We explore the implications of misaligned evaluation metrics [228; 61] and how participatory design can improve the integrity of the data set, promoting equity through the participation of underrepresented community members in data annotation to further index on sociocultural data inclusion. [229; 230]. Additionally, this review discusses inclusive data handling methodologies [225; 231] and the role of AI policies like the U.S. White House AI Bill of Rights in bridging the gap between policy frameworks and practical implementation. The research described in this chapter aims to detail the challenges and opportunities in

enhancing responsibility and representation within NLP data practices, contributing to the discourse on inclusion and fairness in the development and deployment of NLP technologies.

### 4.2.1 Challenges of Including Diversity in NLP Dataset Production Practices

Data practices play a foundational role in the advancement of the NLP field. NLP data practices can fall under the traditional data science work which includes data discovery, data capture, data curation, and data creation [221]. The rapid advancements in AI and ML have highlighted the importance of ethically aligned dataset production to ensure fairness and transparency. FAccT and AIES conferences have further explored how these principles can be applied in AI technologies to reduce bias and enhance representation [225; 231]. Paullada [224] studied the limitations of current NLP data practices in dataset design and development, which deals with data collection or construction as a benchmark; data introspection, which filters or augments data and modeling techniques to improve biased datasets; and dataset culture, which surrounds the culture of using the dataset. For example, tensions in NLP system performance for diverse users and language groups highlight misalignments between dataset creation and diverse realities, presenting socio-technical challenges and the need for critical examination of data practices [232].

Researchers have discussed how biases in NLP data practices such as transcription and annotation can lead to skewed AI models and can perpetuate or even amplify societal inequities [229]. For instance, tweets that included vernacular and linguistic features originating from African American English (AAE) received higher toxicity scores by Perspective API1, a publicly available API to detect toxicity in text [233]. Research suggests that models developed without a baseline and expanded parameters for a widened range of data, may often loosely account for sociolinguistic data, which results in under-performing AI/ML systems for users who speak or communicate in minority language varieties [230]. This often presents chal-

lenges for speakers of minority language varieties, including speakers of African American English [56].

Research has suggested that metrics of successful performance in the commercial tech industry and organizational standards are misaligned and conflict with social realities, sensitive human values, and cultural assets of the community. [61] identified three challenges to incorporating diversity in data practices, including the lack of information about annotators, separation of operation, and competing priorities in ML development. To address these challenges, they propose a participatory approach for practitioners to work with annotators familiar with the language varieties found in a given data set [61; 94]. This paper extends this line of work by empirically examining the NLP practitioners' perspectives on this agenda and identifying challenges and opportunities to achieve this future where practitioners and annotators collaborate and co-create the dataset [61; 224; 54]. Additionally, this work extends prior work by looking at more challenges of including diversity in more stages of data practices, not only about data annotation creation [61].

### 4.2.2 The Demographics of Data Practitioners

This work extends the scholarship from researchers who have examined diversity in data sources and of data workers. Researchers have closely evaluated annotators' identity in relation to how it may shape perspective. Various aspects such as race and ethnicity, nationality, age, gender, sexual orientation, and education level have been a point of exploration [234; 235]. A closely relevant study from [61] who found that AI/ML practitioners had varied understandings of annotator diversity and rarely designed dataset production to account for diversity in the annotation process. Similarly, other scholars have found that annotator identity plans a crucial role in the quality and inclusion of diverse sociocultural data within dataset production. For example, [236] advised AI/ML practitioners to use a diverse set of annotators and a higher replication count (image classifications) for each image when annotating skin tone for fairness research, after finding that even in challenging environments,

crowd-sourced annotators can reliably annotate skin tone datasets as well as AI/ML experts on the Monk skin-tone (MST) scale [237]. Others have found that rater identity is a statistically significant factor in how raters will annotate toxicity for identity-related annotations such as online-text content from African Americans and LGBTQ Americans [220].

### 4.2.3 Critical Human-centered Approaches in Data Practices

Critical approaches in data science advocate for scrutinizing the underlying assumptions in NLP dataset production, proposing methods for mitigating biases and promoting the use of socioculturally diverse data in machine learning. Scholars like [120] emphasize "Data Feminism," which calls for an equitable distribution of power in data practices. Work by researchers such as [238] have explored the limitations of existing datasets and proposed approaches for more responsible data handling which center consent, inclusivity, power, transparency, and ethics & privacy. Others have proposed methods such as developing diverse annotator pools, incorporating iterative human feedback processes, fine-tuning for ethnic dialect in models, and improving documentation practices in data workflows (e.g. datasheets for datasets) [225] [239; 61; 240; 241]. Emergent strategies in AI and HCI have suggested participatory design approaches in ML dataset production as a critical necessity for broadening inclusivity. Studies have discussed the benefits and implications of involving community stakeholders directly in the dataset creation process to ensure the data accurately reflects diverse perspectives [242; 78]. Human-centered design and engineering methods such as community workshops, user-centered co-design sessions, and direct feedback mechanisms can be used to refine NLP datasets.

### 4.2.4 AI Policies on Addressing Algorithmic Disparities

The emergence of AI policies and legislation has recently been introduced to address challenges with the impact of AI on society EU AI Act [243], AI Research Resource task force,

U.S. White House AI Bill of Rights [244] , NCSL Artificial Intelligence 2023 Legislation. In January 2023, the National AI Research Resource Task Force issued a report offering recommendations for how the United States government should go about setting up a public resource to support AI research [245]. The report suggested that consideration of societal impacts should be a part of the process of reviewing proposals to use public resources. The U.S. AI Bill of Rights also specifically expects any AI-driven automated system must "protect the public from algorithmic discrimination in a proactive and ongoing manner." In particular,"any data used as part of system development or assessment should be representative of local communities based on the planned deployment setting and should be reviewed for bias based on the historical and societal context of the data. Such data should be sufficiently robust to identify and help to mitigate biases and potential harms." While many of these policies focus on downstream applications, the applicability and practicality of suggested techniques to be used among technologists remains under-explored. AI/ML training datasets play an important role in the accuracy of the downstream tasks and the data science practices employed to produce them are even more influential. In this work, I also examine how NLP data practitioners view the applicability of guidance outlined in the U.S. AI Bill of Rights to ensure diversity in their work and safe-guard against algorithmic harms.

## 4.3 Study Aims

The study reported in this section was designed to understand the strategies employed by NLP practitioners to mitigate bias and ensure representation within their datasets. A set of survey questions gathered insights that could be quantified and expose trends in experiences and practices. After the survey was completed, a focus group process was used to explore the survey data in greater detail. Focus group discussions were informed by the survey, and used priming questions to stimulate greater discussion of the survey insights. A distinctive of this process was that the participants were presented the aggregated survey data, and

invited to discuss it.

## 4.4 Methods

This study used a mixed methods approach, combining an online questionnaire with virtual focus group interviews to investigate current data practices among NLP practitioners. Participants engaged through an online questionnaire administered via Typeform, which garnered responses from 47 eligible professionals. The recruitment targeted individuals with substantial experience in NLP data work, leveraging social media platforms and professional networks for a broad reach. The collected data underwent quantitative analysis using Microsoft PowerBI and qualitative analysis through focus group discussions, facilitated to enrich and corroborate the initial survey insights.

Prior to data collection, this study was reviewed and deemed exempt by the institutional internal review board (IRB) for human-subjects and ethics compliance. During recruitment, I informed participants of the purpose of the study and researchers' affiliations and obtained informed written consent electronically for all study participants and additional verbal consent for recording of the focus group meeting. I used a mixed-methods approach of an online questionnaire and virtual focus group interviews to collect data, followed by qualitative and quantitative data analysis to inform the research questions.

**Methods Limitations** Questionnaires, while useful for gathering broad mixed-methods insights, can have limitations due to potential non-representative samples, particularly when recruitment is based on word-of-mouth. This may introduce biases reflecting more homogeneous views. Additionally, questionnaires rely on self-reported data, which can be influenced by respondents' subjective perceptions. To mitigate these issues and gain deeper insights, I complemented the survey with a virtual focus group interview. This focus group allowed for richer, more detailed discussions and analysis, helping to clarify and expand upon the survey findings, and uncover more nuanced aspects of NLP practitioners' experiences.

### 4.4.1 Questionnaire

As the primary method of data collection, the purpose of the questionnaire was to gather insights on current NLP data practices from a larger set of practitioners in a lightweight and accessible manner. Specifically, the questionnaire was designed with questions aimed at understanding the strategies employed by NLP professionals to mitigate bias and ensure representation within datasets. Given the semi-structured, exploratory nature of the study, some questions were informed by topics of related works and developed through unvalidated measures [246] to address the unique research questions. The questionnaire was administered via the online platform Typeform, and responses from 47 eligible participants were analyzed and visualized using Microsoft PowerBI.

#### Questionnaire Recruitment and Respondents

The study targeted self-identified NLP data practitioners with professional experience in text and speech NLP systems, encompassing roles such as data engineers, data scientists, data annotators, data researchers, and crowdworkers. Recruitment strategies included outreach via online social networking platforms (e.g., X (Twitter), LinkedIn, Reddit, GroupMe), direct emails, and mailing lists from both internal and external organizations. Additionally, professional networks based on prior collaborations with academic and industry AI teams (e.g., Google, Microsoft, Apple, and Meta) were leveraged. The questionnaire started with an information statement detailing the objectives, benefits and incentives of participation, followed by a disclosure of study procedures and an acknowledgment of informed consent. Eligibility screener questions ensured participants were at least 18 years old, resided and worked in the United States, and had professional experience in NLP dataset production.

**Questionnaire Design** The questionnaire comprised a total of 27 questions (located in appendix), categorized into quantitative: multiple-choice (11), multi-select (5), rating scale (3), and qualitative: open-ended (8) types. Subsequently, the questionnaire explored a vari-

ety of themes that were mapped to the study research questions. The end of the questionnaire included questions on demographic information and a question indicating their interest in engaging in subsequent focus group studies.

**Participant Demographic Details** Out of the 60 respondents who began the questionnaire, 13 were deemed ineligible or declined to complete the survey, resulting in 47 eligible responses for analysis. These respondents, with an average age of 29 (ranging from 19 to 40), held various professional roles in NLP data practices, including researcher, scientist, and engineer positions. Demographic data collected included gender identity, race and ethnicity, languages spoken, and educational credentials. Specifically, the sample comprised 32 men, 13 women, one non-binary/non-conforming individual, and one participant who preferred not to disclose their gender identity. For those interested in participating in a drawing for a 50 USD Amazon gift card, email addresses were collected and aggregated into a participant interest pool. Participant demographic details are provided in (tables: 4.1, 4.2, 4.3).

### 4.4.2 Focus Group Moderation

I, along with a co-researcher facilitated a data analysis focus group involving five practitioners to extend the investigation and data analysis beyond the initial survey results. The focus group aimed to garner more nuanced qualitative data through insights gained from these practitioners supplementary to data from the initial questionnaire. By moderating an expert group discussion, the objective was to corroborate questionnaire insights and involve participants in data analysis through collective dialogue and consensus, further affirming informed strategies for enhancing fairness and broadening representation within NLP dataset production. As the lead researcher, I directed participants to their provided guidebook[2], then transitioned the group into the questionnaire insights review activity. I initially gave

[2]A copy of the focus group participant guidebook used for facilitation can be found at: https://tinyurl.com/nlpstudyguidebook-jc2024

| **Roles/Titles** | **How many (#)** | **Specific areas** |
|---|---|---|
| Data Scientist | 5 | NLP Health Recognition, Ethics and AI, LLM |
| Researcher | 20 | |
| Grad student/postdoc scholar in NLP-related area | 6 | |
| Data Analyst | 4 | |
| Language engineer and Analytical Linguist | 1 | Responsible AI, Extractive Summarization, Fairness, and NLU |
| NLP practioner | 2 | |
| NLP Program manager | 2 | Economic planner |
| Data Engineer | 4 | Data training, audio data engineering |

Table 4.1: Roles/Titles of the survey participants. Among participants, the majority have an intermediate level of expertise at 48.94%. Beginners account for 10.64%, Advanced participants represent 25.53%, and Experts make up 14.89% of the surveyed group.

participants 10-minutes to navigate through the PowerBI report[3] on their own and asked them to review the report and jot notes of any interesting insights or analytics, in addition to any questions that they may have about the data to be discussed further.

**Recruitment and Participants** - The inclusion criteria for the focus group mirrored

[3]A pdf copy of the PowerBI report of the survey data insights can be found at: https://tinyurl.com/nlpdatastudyreport-jc2024 .

| **Race/Ethnicity** | **# of respondents** |
|---|---|
| Black or African American | 20 |
| White or Caucasian | 13 |
| Asian | 10 |
| American Indian or Alaskan Native | 1 |
| Hispanic or Latin Origin | 1 |
| Other | 2 |

Table 4.2: Race/Ethnicity of the survey participants (n = 47).

| **Highest educational degree obtained** | **# of respondents** |
|---|---|
| Bachelors/Undergraduate | 24 |
| Advanced Degree (PhD, JD, MD, etc.) | 10 |
| Masters/Professional Degree | 10 |
| Some college/Associates | 2 |
| Certificate/Skill Training Program | 1 |

Table 4.3: Highest educational degree obtained of the survey participants (n = 47).

those employed for the survey, ensuring consistency in participant selection. Out of 35 respondents who expressed interest in a 1.5-hour virtual expert focus group, five participants were recruited based on the subjective quality of their survey responses, including factors such as compelling content, evident interest in the topic, and nuanced contextual insights. The professional backgrounds of these participants were diverse, with two engaged in academic research and others specializing in data analysis, language engineering, and economic


Figure 4.1: Focus Group Participant Guidebook Cover

planning. Their areas of expertise spanned responsible AI, biotechnology, and economic planning. Each focus group participant received a $75 USD gift card as a token of appreciation for their successful participation.

The focus group session was audio recorded using Jitsi, a free, open-source, and encrypted online conferencing software. Participants were instructed to disable their video cameras and avoid using profile images during the session to ensure anonymity. In contrast, the facilitating researchers' video feeds remained active to foster trust and confidence among participants. To further safeguard the study's integrity and participant privacy, each participant was assigned a code name (table:4.4) based on their professional title (e.g., researcher 1, engineer 2, annotator 3) for use throughout the focus group discussion.

| Codename | Gender | Age | Job Title | Industry/Field |
|---|---|---|---|---|
| Researcher 1 (R1) | He/Him | 25 | Academic Researcher | PhD research |
| Researcher 2 (R2) | She/Her | 24 | Academic Researcher | Responsible AI/Tech |
| Data Analyst 1 (DA1) | He/Him | 29 | Biotech Data Analyst | Bio tech |
| Data Engineer 1 (DE1) | She/Her | 29 | Language Engineer | NLP |
| Data Analyst 2 (DA2) | He/Him | 33 | Economic Planner | Economics Planning |

Table 4.4: Profile of focus group participants.

### 4.4.3 Study Data Analysis

I analyzed and visualized the questionnaire data using Microsoft PowerBI, summarizing the data through quantitative and qualitative measures. The quantitative descriptive analysis approach facilitated a better understanding of the questionnaire-data distribution and variability through calculations of means, percentages, and number of responses. For instance, for questions involving multiple choice, multi-select options, and rating scales, I employed calculations alongside histograms or pie charts to illustrate the distributions. I performed inferential analysis to make interpretations or inferences about the population based on the survey data.

For open-ended questions, I employed a grounded-theory approach to categorize responses and thematically analyze them. I initially conducted a round of open-coding on the written responses to allow new inductive codes to emerge. I then performed a round of axial-coding to aggregate and condense coded excerpts into broader categories. Finally, I conducted a round of selective-coding to connect the broader excerpt with overarching themes of the survey study areas, thus informing the findings. To effectively communicate sentiments from participants, I include direct quotes from in the Findings, with the survey respondents men-

tioned broadly as "respondent," and focus group participants by their assigned participant ID (e.g. R1) to differentiate them in the analysis.

## 4.5 Findings

The analysis begins with a detailed description and summary of the experiences of the NLP practitioners involved in both the survey study (n = 47) and focus group (n = 5), highlighting the categories of various NLP technologies they reported working on (4.1). The practitioners predominantly engaged in text and speech data collection and annotation for NLP model training, as well as research on data practices and methodologies. These activities were particularly relevant to NLP technologies such as automated speech recognition (ASR), virtual assistants, smart home devices, and sentiment analysis. Notably, the practitioners reported minimal experience in addressing bias mitigation within training datasets.

Subsequently, the findings are presented in alignment with several thematic areas: practitoners' experience in NLP data practices (4.1), diversity and representation within data collection practices (4.2), consensus building and quality assurance in data annotation (4.3), considerations towards representation and inclusion (4.4), diversity in the data production pipeline (4.5), and perspectives on AI policy and regulation (4.6). These findings illuminate the current landscape of NLP data practices from the viewpoints of practitioners and experts, identifying strategies to enhance representation and inclusion of underrepresented sociocultural context in NLP data practices. The analysis also exposes gaps in current practices that may hinder these objectives. The discussion elaborates on opportunities to address these gaps and provides implications for future research and practice.

### 4.5.1 Practitioners' Experience in Natural Language Processing (NLP) Data Practices

The initial set of questions sought to understand NLP practitioners' experience in organizing, collecting, transcribing, and analyzing text or speech data for NLP datasets. The survey study analysis primarily informed context of the NLP data works that respondents had as practitioners, which I recognized to be predominantly in data collection or annotation for text/speech model training. NLP practitioners had the least experience mitigating bias in data training sets, so I utilized focus group discussions to gain understanding of this area.

The survey study surfaces the various areas of experience in data work that many of the practitioners had through the options provided. When analyzing responses for survey question [**SQ-6a**] **"What domains of experiences have you had in within data science for text or speech NLP?,"** it appears that NLP practitioners had the most experiences in the following areas of the seven options provided:

- 76.60 % - Data collection or annotation for text/speech model training,
- 46.81% - Research on data practices or methods,
- 42.55% - Organizing and managing data annotation projects, and
- 38.30% - Training and supervising teams of data workers.
- 38.30% - Auditing or evaluating quality of data collection/annotation,

While other areas were less frequent in the data:

- 31.91% - Developing evaluation models to measure effectiveness of training data,
- 23.40% - Mitigating bias in data training sets.

Given this context, I became interested in further investigating the areas in which respondents had the least experience as NLP practitioners, particularly in mitigating bias in data training sets.

**Focus Group Analysis and Discussion**

**[FG-6a.1] The domain area with the least number of people having experience is: Mitigating bias in data training sets ( 6%). Why might this be? Why might it be a challenge for NLP practitioners to be less experienced in mitigating bias?** Focus group discussions provided deeper insight into this finding, revealing both practical and philosophical challenges that may hinder efforts in this area. Participants expressed concerns over the potential repercussions of identifying biases, including financial costs and negative impacts on organizational reputation, which may discourage proactive measures in bias mitigation. DE1 suggests a pragmatic or perhaps cynical view of the corporate or organizational mindset regarding bias mitigation sharing that "if they look for a problem they'll likely find one" implies a reluctance to seek out biases because acknowledging them necessitates action (which might include financial costs and damage to the organization's reputation). The mention of "Short contracts don't meet basic needs" highlights another practical issue—temporary or short-term employment in NLP projects might not provide the stability or incentives needed for workers to engage deeply with complex issues like bias mitigation.

NLP practitioners reported working on a wide variety of NLP projects. To gain a holistic view of the text and speech NLP technologies, features, or functionalities, I asked survey respondents to share specific examples (**[SQ-6c] Can you share an example of a specific text or speech NLP-enabled project (technology, feature, tool) that you have worked on?**). Below, I describe those mentioned by the 47 NLP technologists. The responses were categorized and the number of respondents associated with each category is indicated.

| Category | # of responses | Responses |
|---|---|---|
| Automatic Speech Recognition (ASR) | 8 | Speech to text dictation apps, Automated speech recognition |
| Virtual Assistants | 12 | Smart Speakers and Home Devices (9), Virtual Assistant |
| Sentiment Analysis | 7 | Sentiment analysis for customer reviews |
| Machine Translation | 4 | |
| Text Classification | 2 | Healthcare related text classification, Media article classifier |
| Language Generation | 2 | Language generation and annotation with human crowd sourced work |
| Other Technologies | 3 | spam email detection, clinical text processing for race/ethnicity annotations, and question answering systems |

Table 4.5: Example of a specific text or speech NLP-enabled project (technology, feature, tool) that survey respondents have worked on.

### 4.5.2 Diversity and Representation in Data Collection

In seeking to understand NLP practitioners' considerations for diversity and representation within data collection practices, I asked **[SQ-7a] How do you strive for diverse representation and inclusion in the datasets you curate?** I analyze open-responses from N=19 survey respondents who elaborated on their efforts. It is significant to note that 28 survey respondents indicated that striving for diversity representation and inclusion in dataset production was either not-applicable to their role or was not a factor at all.

The findings from this analysis indicate that some NLP technologists – though certainly not all – are actively taking steps to promote diversity and inclusion in their datasets, while many recognize the disparities. Four key themes emerged from the responses which included:

1. Seeking data from diverse sources,

2. Building diverse teams,

3. Implementing data quality practices, and

4. Prioritizing and cultivating practices that enhance diversity.

However, there is also evidence of areas for improvement, such as the need for more specific methods for balanced sampling, detailed explanations of bias mitigation techniques, and the development of metrics to measure progress towards diversity and inclusion goals.

In regards to data sourcing strategies, a prevalent theme was the active pursuit of data from various sources representing different cultures, demographics, and communities. Examples included online communities, minority-specific resources, and media outlets with diverse coverage. Additionally, several responses highlighted the importance of collaborating with underrepresented minority communities to gather data. This suggests a recognition of the value of community-specific language and perspectives. A few responses acknowledged the need for balanced representation and incorporating inclusive sampling methods. Although specific techniques were not widely mentioned, this suggests a potential area for further exploration. On the theme of data acquisition and annotation, some responses mentioned using ethical and responsible data collection methods, referring to techniques that consider broadened areas of representative data and avoid bias during data gathering. Additionally, respondents emphasized how diverse teams can contribute to identifying and mitigating bias in datasets. Some suggested how their organizations and teams prioritized language experts such as linguists, along with data annotators with diverse backgrounds. In terms of data quality and auditing practices, NLP professionals shared that regularly reviewing and updating datasets is an important aspect to ensure that datasets remain relevant and reflect evolving cultural nuances. A few responses highlighted the significance of mitigating bias through techniques like pre-processing and feedback loops. And checking data accuracy across different demographics is another practice mentioned, to ensure that datasets repre-

sent the populations accurately. Finally, a single response acknowledged the challenge of adopting diversity and inclusion metrics in NLP datasets when priorities may differ based on the project's stakeholders. This highlights the rigid dichotomy of the ability to address under-representation against organization constraints and need for flexibility and influence in dataset curation.

### Focus Group Analysis and Discussion

Twenty-one survey respondents mentioned one of the following topics: actively seek diverse sources, regularly review datasets, and incorporate inclusive sampling methods for balanced representation. I asked **[FQ-7a.1]: How might NLP practitioners source diverse datasets? What limitations or challenges could make sourcing this data difficult for NLP practitioners?**

Three focus group participants shared their perspectives, indicating that factors such as data volume and representation, ethical considerations in data sourcing, as well as cost constraints and practical solutions, present challenges associated with sourcing diverse datasets. Several participants highlighted the challenge of obtaining sufficient data volume from all populations. As R1 noted, "Not all populations might be able to provide the same 'volume' of data, to be considered across scale." This raises concerns not only about the ability to represent all groups equally within datasets, but also the burden and undue oversight for those already disproportionately affected groups.

The focus group expressed a strong desire for datasets that encompass diverse races, regions, and experiences. DA1 and DA2 echoed this sentiment, stating "data should be diverse and cover all races and all areas, not one region only. It's supposed to be for all." Subsequently, DE1 raised critical concerns about the potential for exploitation when sourcing data from annotator pools with significant economic disparities. They highlighted, "There is a constant struggle with budget for things like this... Data annotator pools are often sourced from foreign communities where the American dollar is worth more than the local currency.

This can create a weird power dynamic by people who need to make a living and can do that by checking boxes." This emphasizes the importance of ethical considerations and fair compensation practices in data sourcing.

Lastly, in relation to cost and practical constraints, The focus group acknowledged that budget limitations can often prioritize cost-effectiveness over diversity in data collection. DE1 pointed out, "Most of the time in my experience a company will look at how they can produce the most data for the least cost first before considering any other kind of diversity search." This suggests a need for creative solutions to balance cost with inclusivity. One participant mentioned using synthetic data generation techniques to expand datasets while aiming for demographic representation. DE1 explained, "Another way we get data like this is from generating synthetic data based off of data we can already see belongs to a certain demographic and try to pattern match that as best we can." While there is a clear desire for increasing inclusion, participants raised concerns about practical applicability. Future research can explore strategies for overcoming these challenges and promoting best practices for ethical and diverse data sourcing in NLP.

When examining responses to **[SQ-7b] Do you take into account any social demographics or nuances (ethnic, cultural, or linguistic) of data subjects during NLP data collection?** I summarize the analysis from 30 survey respondents who elaborated on this. Is it important to note that 17 respondents indicated that this question was not-applicable or a considerable factor to their roles or experiences. The survey responses suggest that a growing number of NLP technologists recognize the importance of considering social demographics and cultural nuances in data collection. Various factors are taken into account in data collection that highlight the purposeful pursuit of diverse and inclusive data such as race, cultural assets, American English accents or dialects, speaker region, age, gender, socioeconomic status, disabilities, and sexual orientation.

A strong theme emerged around the importance of considering social demographics and cultural nuances to ensure diverse and representative datasets. This was reflected in sur-

vey responses like: "Yes, consider diverse social demographics and nuances by ensuring a broad representation..." and "...proactively consider social demographics and nuances. This involves purposeful selection of datasets reflecting diverse ethnic, cultural, and linguistic aspects." Another theme that emerged was intentional consideration of specific aspects of social demographics and cultural nuances to be taken into account. These include: Race/Ethnicity: This was the most frequently mentioned demographic (e.g., "We not only annotated for race and ethnicity labels..."); Language: Accents, dialects, and English varieties were all mentioned (e.g., "Accents," "We used specific criteria to screen participants for membership in a specific dialect group"); Culture: Cultural background and sensitivities were noted by some (e.g., "We did collect the social demographics... cultural nuances and sensitivities"). Region: A few responses mentioned considering regional variations based on country, state, and geographic areas (e.g., "regionality"). A few responses mentioned other aspects such as age, gender (e.g. male, female, non-binary), income-level or socioeconomic status, accessibility challenges or disabilities (e.g. stuttering, stammering), and queer-identity (LGBTQAI+). It was also noted that certain social identity aspects were more relevant to some NLP technologies than others. For example, one respondent shares "these features weren't included when we applied sentimental analysis." NLP capabilities like automated speech recognition (ASR) were more commonly associated with considerations for social demographics and cultural nuances. One participant shares "in my own work within ASR research, in considering speakers of AAVE, I consider ethnic, cultural, and linguistic aspects."

### 4.5.3 Defining and Measuring Success in NLP Dataset Annotation

The survey study surfaces the complex and nuanced nature of defining and measuring success in the critical field of data annotation. To explore consensus and quality assurance among data annotators for NLP datasets and system design, I presented the following question to 47 survey respondents: **[SQ-8a] In your project experience, how is a data annotator's performance measured?**

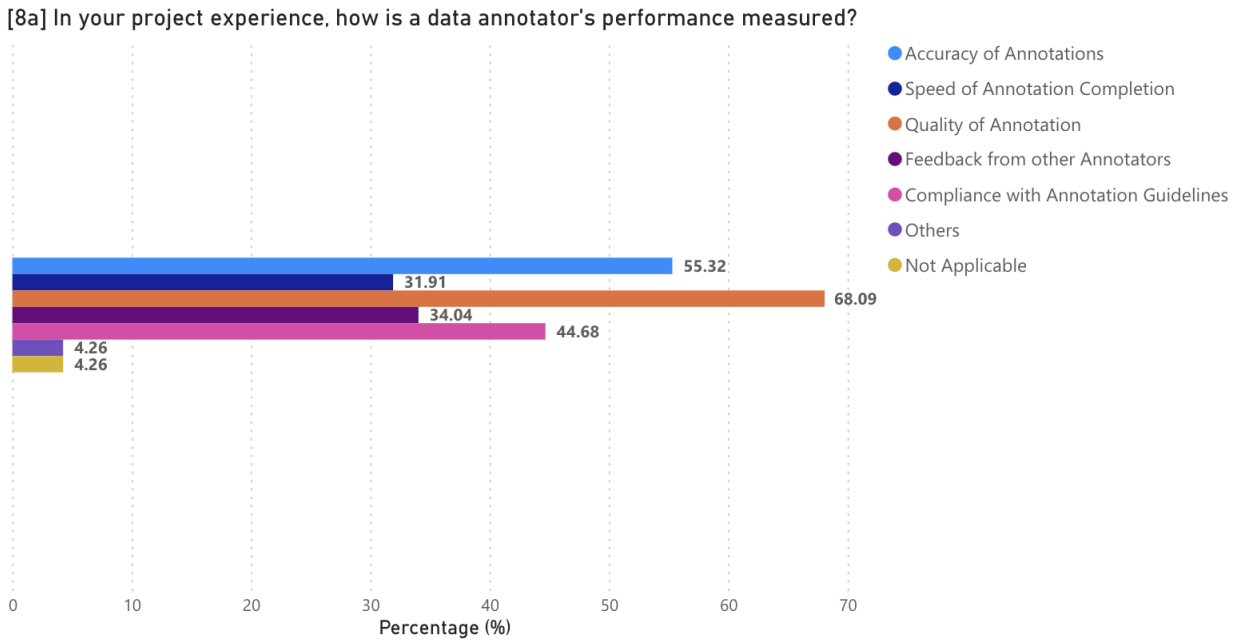


Figure 4.2: Data Annotator's Performance Measurement

Using checkboxes, respondents indicated their applicable options:

- 68.09% - Quality of Annotations,
- 55.32% - Accuracy of Annotations,
- 44.68% - Compliance with Annotation Guidelines,
- 34.04% - Feedback from other Annotators,
- 31.91% - Speed of Annotation Completion,
- 2% - N/A.

- Another 2 respondents indicated other options such as annotators' participation in "internal annotator agreements" and full scale data collection effort like " recruiting participants, scheduling recordings, paying participants, collecting their data/paperwork and recording the tasks."

**Focus Group Analysis and Discussion**

During the initial data analysis *Quality of Annotation* and *Accuracy of Annotations* were among the highest rated factors that indicate a data annotator's performance based on the submissions from survey respondents. To gain further insights, the focus group participants were asked: [**FG-8a.1**] **How is quality and accuracy defined for data annotators? Who develops metrics of success for data annotators?**

Only 2 out of 5 focus groups participants shared thoughts on this discussion point. An analysis of focus group responses by NLP technologists, combined with previous survey insights, offers valuable perspectives but also reveals a lack of clear consensus. One key finding is that the notions of "quality" and "accuracy" in annotation are inherently subjective. While factors like adherence to guidelines, consistency, and the overall usability of the annotated data are commonly cited, there is no universal definition that applies across all projects. This raises the question of whether the field would benefit from developing more standardized definitions to facilitate clearer communication and goal-setting.

The focus group responses also highlighted the tension between speed and quality as performance metrics. In some contexts, the ability to meet deadlines and produce a large volume of data is paramount. DE1 shares "I think it's really interesting that speed ranks so low in the graph. I spent two-ish years as an annotator and speed was considered a much more important factor as meeting deadlines was more important than having more quality data to the point where they limited how much time we could spend in the chat room asking questions when we were stuck because it was too expensive." In others, the meticulousness and detail of the annotations take priority. This tension is influenced by the project's scale,

the type of data being handled, and the project's overall objectives (R1).

The approaches described in developing metrics for annotator success are equally diverse. Some approaches involve collaborative input from annotators, while others rely on a top-down approach by managers or clients (DE1). Multi-step blind review processes add a layer of objectivity, but can also increase complexity. In any case, the importance of well-developed and unambiguous project guidelines appears as a shared value across participant responses, both for guiding annotation work and for establishing relevant success metrics.

In further exploration of data annotation metrics of success, **[SQ-8b] In your project experience(s), how much time is typically allocated to resolving potential conflicts of opinion among data annotators?**

A moderate to substantial amount of time is allocated to resolving potential conflicts of opinion among data annotators. %40.43 (19) - Some: A moderate portion of time is allocated to resolving potential conflicts of opinion; %25.53 (12) - Very little: Only a small amount of time is dedicated to addressing conflicts of opinion; %23.4 (11) Significant - A substantial amount of time is dedicated to addressing conflicts of opinion; 8.51% (4) - None: No time is allocated to resolving potential conflicts of opinion; Only one respondent indicated that this was N/A.

These responses suggest at least some degree of attention to addressing differing viewpoints during annotation. Active conflict resolution practices can help identify potential biases and create a more inclusive dataset. These findings underscore the need to allocate adequate resources and time to conflict resolution in data annotation processes.

### 4.5.4 Considerations Toward Representation and Inclusion within Data Practices

To explore NLP experts' considerations toward representation and inclusion in NLP datasets, 47 survey respondents were asked: **[SQ-9a]What factors should be taken into account**

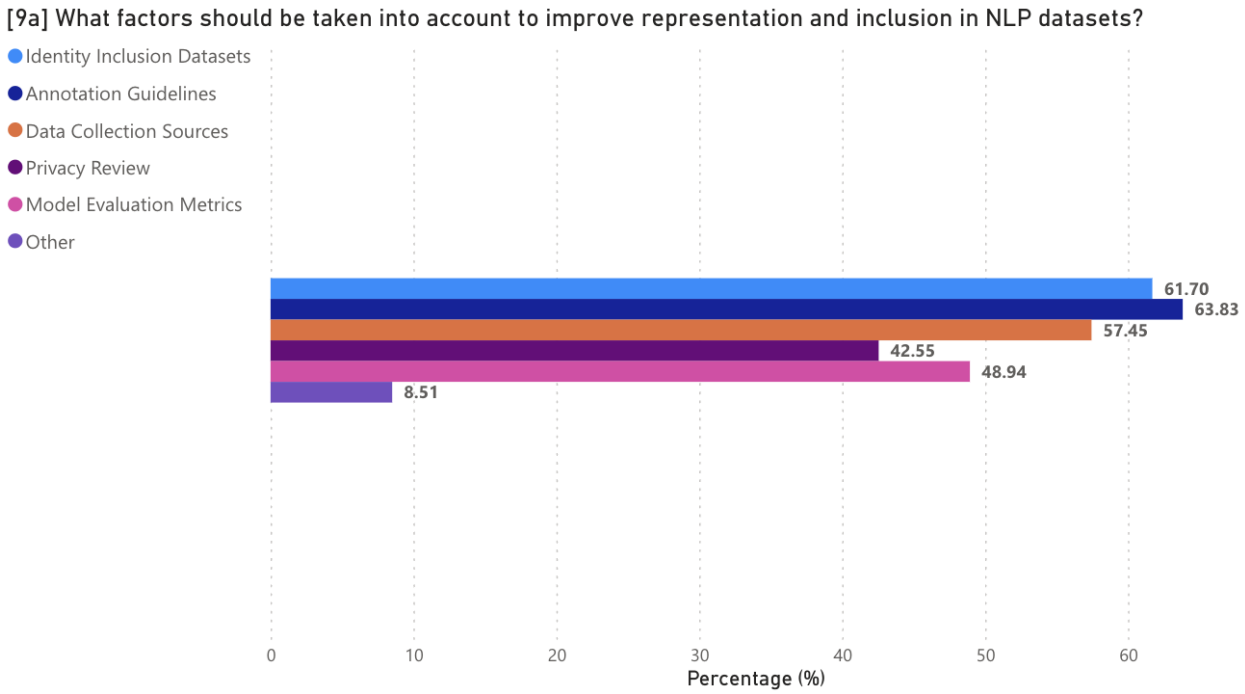


Figure 4.3: Factors to Consider for Improve Representation and Inclusion in NLP Datasets

**to improve representation and inclusion in NLP datasets?** Using checkboxes, respondents indicated their applicable options: 63.83% - Annotation Guidelines; 61.70% - Identity Inclusion Datasets; 57.45% - Data Collection Sources; 48.94% - Model Evaluation Metrics; 42.5% - Privacy Review.

This survey's insights elevate "Annotation Guidelines" and "Identity Inclusion Datasets" as the foremost factors for enhancing representation and inclusion in NLP datasets, with more than 60% of experts underlining their importance. "Annotation Guidelines" are particularly crucial, suggesting a growing awareness within the field about the direct impact of human-mediated data processing on algorithmic outcomes. The emphasis on "Identity Inclusion Datasets" indicates an understanding of the need for datasets that reflect a full spectrum of human identities to foster interactive systems that can serve a globally diverse

user base. But applicability of socio-cultural identity data may vary depending on the type applications for a range NLP systems. Four survey respondents indicated "Other" factors such as "Expose the model to as many different cultures, backgrounds and cultures as possible within their training data," "Non-algorithmic metrics such as bias/harm," "take into account who owns these datasets and question if it should be researchers who hold the keys to access or communities," and "Stop using percentages and popular vote for annotations; leave the deviants intact, which has been proven to increase accuracy."

**Focus Group Analysis and Discussion** The focus group discussion unveiled critical insights into the under-emphasis on "Model Evaluation Metrics" given its statistically lower rating among survey participants. Four focus group participants shared their perspective to the question: [**FG-9a.1**] **Why might model evaluation metrics be a less prioritized factor? What are current challenges to evaluating NLP system performance and how might this play a role in understanding how well systems work for diverse users?** Participants like (R1) expressed concerns over the existing quantitative metrics' inability to capture linguistic nuances and contextual appropriateness, a limitation that becomes particularly evident in sentiment analysis. For example "A sentiment analysis algorithm might see a word like "hate" to be negative but in the context of a statement like 'I hate how this show ended on a cliffhanger' it is not negative" (R1). This reflects a broader challenge in NLP evaluation—developing metrics that accurately reflect the multifaceted nature of language use and its interpretation by diverse user groups. Furthermore, the lack of industry-wide standardization in defining data quality and the success of NLP systems exacerbates this challenge, as noted by participants (DA1, DA2). The particular struggle to devise metrics for voice-activated systems, which must navigate the complexities of accent and dialect diversity, was also underscored (DE1). These discussions suggest that while "Model Evaluation Metrics" are crucial, their development is hindered by both technical and ethical challenges, the latter highlighted by concerns over the data collection process

itself.

Using a 5-point likert scale (0-5) indicating importance, survey respondents were asked **[SQ-9b] To what degree would you consider it an important responsibility of data science teams to develop systems that are accurately representative of users' experiences through data?**

- Only a small fraction (4.26%) considered it Slightly Important, which might suggest that these respondents prioritize other factors or believe that the responsibility may lie elsewhere, possibly with different roles or at a different stage in the AI/ML pipeline.

- A slightly higher percentage (9%) believes it to be Moderately Important. This group may recognize the importance but also see the complexity of achieving accurate representation, or they might believe in a shared responsibility across multiple stakeholders.

- Important was selected by (27.66%), and nearly half of the participants (48.94%) rated it as Very Important. This overwhelming majority underlines a strong belief in the critical nature of this responsibility, suggesting that data science teams should prioritize the development of representative systems to ensure that the user experiences, particularly those of marginalized groups, are considered.

The data unambiguously indicates that the majority of NLP/ML practitioners (76.6%) consider it a vital responsibility for data science teams to ensure their systems authentically reflect user experiences.

### 4.5.5 Diversity in the NLP Dataset Production Pipeline

To explore the areas of the data production pipeline where diverse community input and participation could possibly assist, survey participants were asked four relevant questions. Twenty-eight out of forty-seven respondents elaborated on the first question, with 19 respondents indicating that this was N/A or not a consideration in their role or experiences.

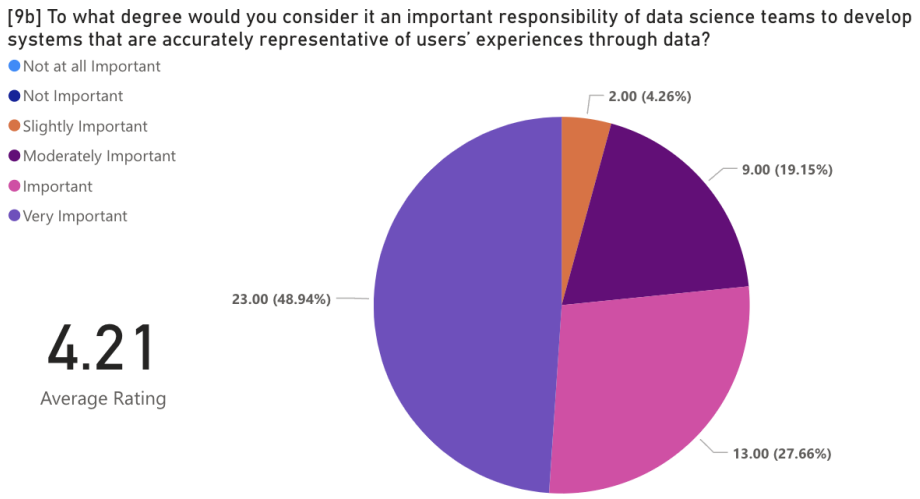


Figure 4.4: Suggestive Importance of Developing Inclusively Representative NLP Systems among Data Science Teams

I asked: **[SQ-10a] Have you ever considered involving diverse community members with varying demographic backgrounds (gender, age, race/ethnicity, geolocation, etc.), and at what stage of an NLP project pipeline could external community input be useful?**

18 respondents specifically stated "Yes" or provided a detailed description of how and at what stages they involve diverse communities. Some respondents detailed multiple stages or continuous involvement throughout the project pipeline. The analysis surfaced the various considerations of how and when involving external diverse community members' input would be valuable in developing more inclusive datasets phases to ensure diversity, representation, and equitable participation from the start. These areas included: Early stage involvement (e.g. planning, project/study design), Full-scale inclusion through the entire data production pipeline, Specific stages for community input (e.g. collection, model training and evaluation, deployment and feedback, and innovative equity-centered practices (e.g. community advisory board). Additionally some respondents hint at challenges or the absence of current

involvement of diverse groups, often related to practical limitations in their roles or existing project structures. One respondent shares "Not so far in my work, since data is usually already collected."

**Focus Group Analysis and Discussion** In further exploring this, focus group participants were asked **[FQ-10a.1] Can you further discuss what forms of input from diverse community members would be beneficial for these stages? What could you NLP practitioners learn from these external partners?**

Two focus group participants elaborated on reasons why the participation of diverse external communities would be beneficial in their NLP work. DE1 elaborates on how more diverse teams are often better equipped to identify and solve unique challenges, as they can draw upon a broader spectrum of ideas and experiences; "To have the most well rounded product you need a well rounded team." R1 emphasized co-annotation with end-users and other stakeholders, where community members work alongside NLP practitioners to label, correct, and validate data. This would have inherent benefits for NLP such as enhancing data quality, increasing representation, and building trust & transparency among technology users. And focus group participants emphasized the learning opportunities for NLP practitioners when engaging with community participatory innovation which include: gaining deeper insights into how different communities use language, which can help in designing more accurate and inclusive algorithms; heightening awareness of ethical considerations, such as bias mitigation and data privacy; and learning effective ways to engage with and incorporate feedback from diverse groups, which can be crucial for ongoing project success and relevance.

By directly engaging diverse communities and groups in NLP dataset production, NLP practitioners and technology development organizations ensure that the data collected is as representative and unbiased as possible. As indicated in [SQ7b] such groups could include geographic/residential communities, cultural linguistic communities, ethnic and racial groups,

various ages and generations, gender and sex groups, disability communities, and various socioeconomic groups.

**[SQ-10b] Do you think the demographic background (gender, age, race, nationality, etc.) of data technologists (workers, annotators, engineers, researchers) can affect the outcome of NLP datasets?** 96% of survey respondents thought that the demographic background (gender, age, race, nationality, etc.) of data technologists can affect the outcome of NLP datasets. The overwhelming agreement among survey participants on question [SQ-10b] reflects a significant consensus on the perception of how the demographic background of data technologists can influence the outcome of NLP datasets.

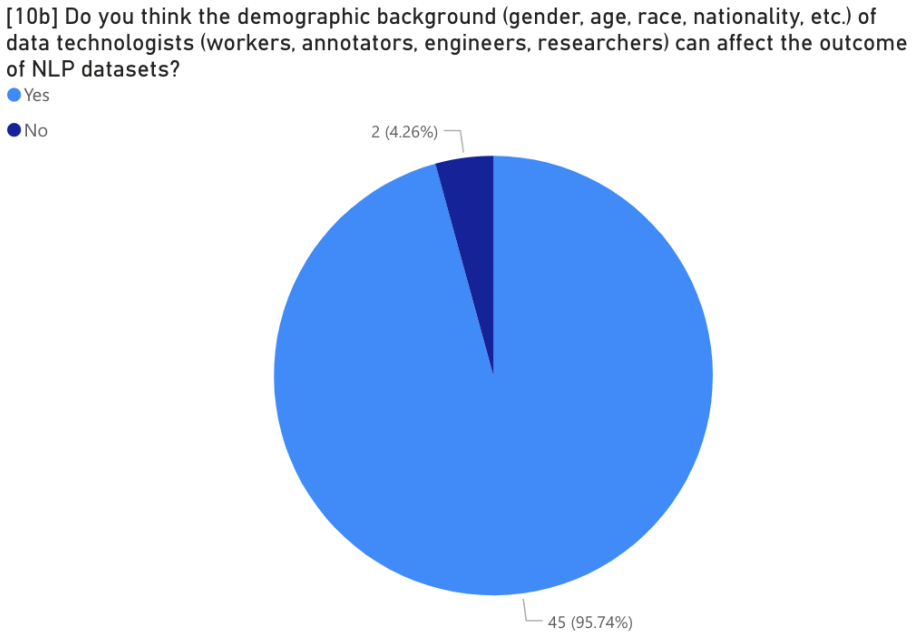


Figure 4.5: Whether Demographic Backgrounds of Data Technologists Affect Outcomes of NLP Datasets

On a 5-point likert scale, 47 respondents indicated [**SQ-10c**] **How feasible might it be to involve external communities of annotators in your NLP data annotation processes and workflows?**

Responses indicated: 34.04% - Fairly feasible, 27.66% - Very feasible, 21.28% Feasible, 14.89% - Less feasible, 2.13% - Not feasible.

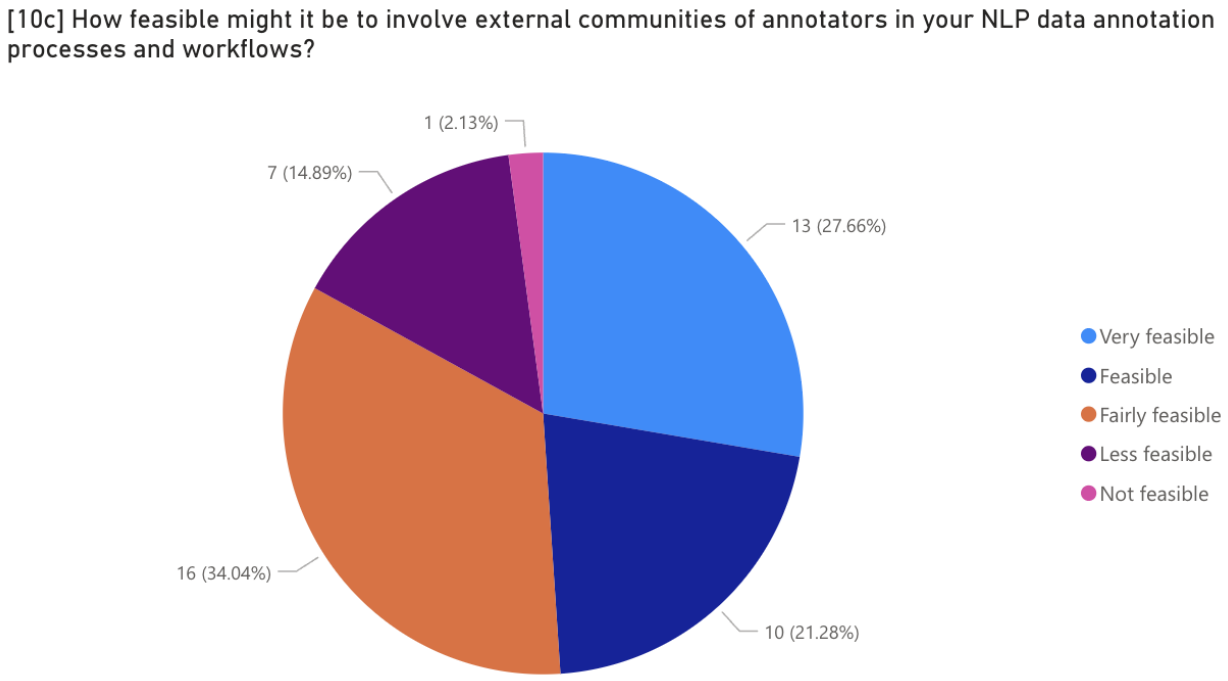


Figure 4.6: Feasibility of Involving External Communities as NLP Data Annotators

High Feasibility (83.98%): Combining "Fairly feasible," "Very feasible," and "Feasible," a significant majority of the respondents (39 out of 47) indicate that it is at least feasible to some degree to involve external communities in the annotation process. This positive response suggests a general optimism or existing precedents within the industry that support such involvement. Less Feasible (14.89%): A smaller group indicates that involving external communities might present more substantial challenges, perhaps due to issues like confidentiality, complexity of data, or the need for specialized knowledge that external annotators might not possess. Not Feasible (2.13%): A very small fraction see it as not feasible, potentially due to structural, regulatory, or technical barriers that they perceive as insurmountable in their specific contexts.

Using checkboxes, respondents indicated their response to **[SQ-10d] What challenges**

**or tensions might external community members face if involved with NLP data annotation?**

Responses indicated:

- 44.68% - Access to data sources;
- 44.68% - Length of time to productively annotate;
- 42.55% - Understanding metrics of success;
- 40.43% - Understanding the application or technology in which data is used for;
- 23.40% - Annotation quality

Seven respondents ( 14.89%) indicated "other" and expressed challenges through open-response on the survey form. Challenges that were mentioned included recruitment difficulties, logistical considerations, and integration with existing teams. Additional insights from open responses further underscored the complexity of these challenges and the practicalities of engaging external annotators or collaborators.

- Model Over-tuning: One respondent noted a situation where meticulous training led to a model that performed poorly when variations or errors were introduced, underscoring the importance of realistic training scenarios.
- Cultural and Linguistic Barriers: Language differences and cultural nuances can complicate the annotation process, requiring additional layers of understanding and accommodation.
- Privacy and Security Concerns: Highlighted by some respondents, these are crucial in managing how data is accessed and used, especially when sensitive information is involved.

- Undervaluing external community experts knowledge: Two respondents share the tension of potentially underestimating the input of external experts "They are experts too and I worry that researchers would not see this;" "I worry about community members being 'glossed over' or dismissed, particularly as annotators."

**Focus Group Analysis and Discussion** Subsequently, I asked the focus group participants: [**FG-10d.1**] **Why might external community members' knowledge and skills be undermined in NLP data annotation work? Who are the actors that influence their potential involvement within private companies and within academic or research-based institutions?**

Participant D1, sheds light on some underlying perceptions and structural issues in the field of NLP data annotation that can impact the involvement and valuation of external community members' skills and knowledge. They shared "annotation and data work is considered and sold as low skill work gig/contract work that anyone could do..." This sentiment highlighted that annotation and data-related tasks are often viewed and marketed as low-skill work. This categorization implies that such tasks require minimal specific knowledge or expertise, which can undermine the value of the contributions from external community members who may bring specialized insights or nuanced understanding to the process.

These findings suggest that while there is enthusiasm for involving external communities in NLP annotation, significant strategic, operational, and educational efforts are required to address these challenges effectively.

### 4.5.6 Perspectives on AI Policy and Regulation

To gain perspective on the Blueprint for an AI Bill of Rights[4], which is aimed at making automated systems work for the American people, I asked survey respondents [**SQ-11a**]

[4]The pdf document of the U.S. Whitehouse Blueprint for an AI Bill of Rights can be found at: https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf

**Before this survey, how familiar were you with the Algorithmic Discrimination Protections outlined in the U.S. White House Blueprint for an AI Bill of Rights?**

- 34.04% - Slightly familiar; 25.53% - Moderately familiar; 25.53% - Not familiar at all; 8.51% - Very familiar; 6.38% - Extremely familiar.

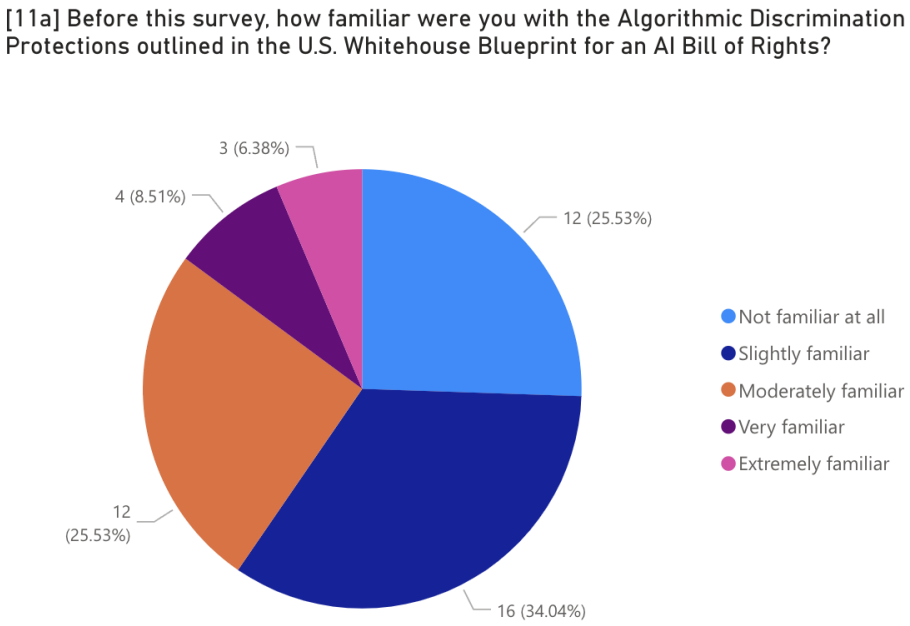


Figure 4.7: NLP Practitoners' Familiarity with AI Bill of Rights

I found that NLP practitioners who were survey respondents had low familiarity with the Algorithmic Discrimination Protections outlined in the U.S. White House Blueprint for an AI Bill of Rights.

- With over 25.53% of respondents not familiar at all and only a combined 14.89% being very or extremely familiar, it seems there is a significant portion of my sample that lacks deep knowledge of these protections. This could suggest a gap in policy awareness among NLP practitioners, which might impact how effectively these guidelines are integrated into practice.

- Additionally, the moderate familiarity (25.53%) and slight familiarity (34.04%) levels indicate a baseline awareness but perhaps not a detailed understanding of the policy specifics. This distribution might reflect the general exposure of practitioners to policy discussions without necessarily having detailed knowledge or understanding of how

these policies apply to their day-to-day work.

On a 5-point likert scale ranging from 'not important at all' to 'absolutely essential', 47 respondents responses to **[11b] In your opinion, do you believe that an AI Bill of Rights is necessary to ensure responsibility and representation in NLP data-centric systems, safeguarding against algorithmic discrimination and bias?**

- 40.43% - Important; 31.91% Moderately Important; 21.28% - Very Important; 4.26% - Slightly Important; 2.13% - Not Important

A substantial (93.62%) of respondents rated the necessity of an AI Bill of Rights as at least moderately important, with a majority (62.71%) leaning towards 'important' or 'very important'. This suggests a strong recognition of the importance of formal guidelines or regulations in managing AI's ethical implications. A small fraction (6.39%) considered it only slightly important or not important. This minority viewpoint could be explored further to understand the reasons behind their skepticism or disagreement, which could provide a more nuanced view of the challenges or disagreements regarding AI regulation in practice.

**Focus Group Analysis and Discussion** To gain even more perspective on these insights, I asked the focus group:[**FG-11b.1**] **Why might the AI Bill of Rights and other forms of AI regulation policy be important to technologists and also the public (users, consumers, customers, residents)?** The sentiments shared by the focus group participants underscore the importance of an AI Bill of Rights from both a technologist's perspective and the broader public's viewpoint.

- DE1 points out the practical and immediate consequences of AI advancements, such as the creation of deepfakes and privacy invasions. They emphasize the need for regulation to mitigate harms that have already become evident as AI technology has become more pervasive and capable, sharing "We need regulation to keep people safe." Other participants affirmed this sentiment.

- DA2 advocates for the Bill as crucial for protecting consumer privacy and ensuring that data usage respects individual rights "regardless of their class of life." This perspective aligns with public concerns over data sovereignty and privacy and highlights the exploitation of data by large firms. Furthermore, DA2's call for equitable protections under AI regulations, reinforcing the role of AI policy and governance in promoting fairness and preventing discrimination.

These findings provide a robust framework for discussing the perceived necessity of an AI Bill of Rights in safeguarding against biases and ensuring responsibility in AI applications, particularly in NLP-focused systems.

Using multi-select checkboxes, 47 people indicated their survey response to [**11c**] **Review the outlined expectations for Algorithmic Discrimination Protections on (pg. 26) of the Blueprint for AI Bill of Rights document, please rate how you perceive the relevance of this expectation on your work.**

This distribution of responses provides a useful breakdown of how NLP practitioners perceive the relevance of different Algorithmic Discrimination Protections from the Blueprint for an AI Bill of Rights to their work. Each selected expectation reflects a different aspect of AI system design and implementation, offering insights into which areas practitioners find most pertinent and potentially where more education or resources might be needed.

- 59.6% - Representative and robust data;
- 52.3% - Ensuring accessibility during design, development, and deployment;
- 42.6% - Proactive assessment of equity in design;
- 40.4% - Ongoing monitoring and mitigation;
- 29.9% - Guarding against proxies;

- 27.7% - Disparity mitigation;
- 27.7% - Independent evaluation;
- 23.4% - Disparity assessment;
- 17% - Reporting.

The findings could suggest advocating for industry standards that particularly emphasize ongoing monitoring and proactive assessment of equity, ensuring these become routine practices.

47 survey respondents were asked to assign a rank from 1 to 6, where 1 indicates the most responsible and 6 indicates the least responsible to the following question: [**11d**] **Who should be responsible for ensuring that there are safe-guards in place to prevent AI from being discriminatory, harmful, or unfair?**

This ranking by the survey respondents provides a clear hierarchy of perceived responsibility for ensuring AI systems are non-discriminatory, safe, and fair. It suggests a preference for a regulatory approach, where government entities at various levels play the primary role, complemented by engagement from users, advocacy groups, and the tech industry itself.

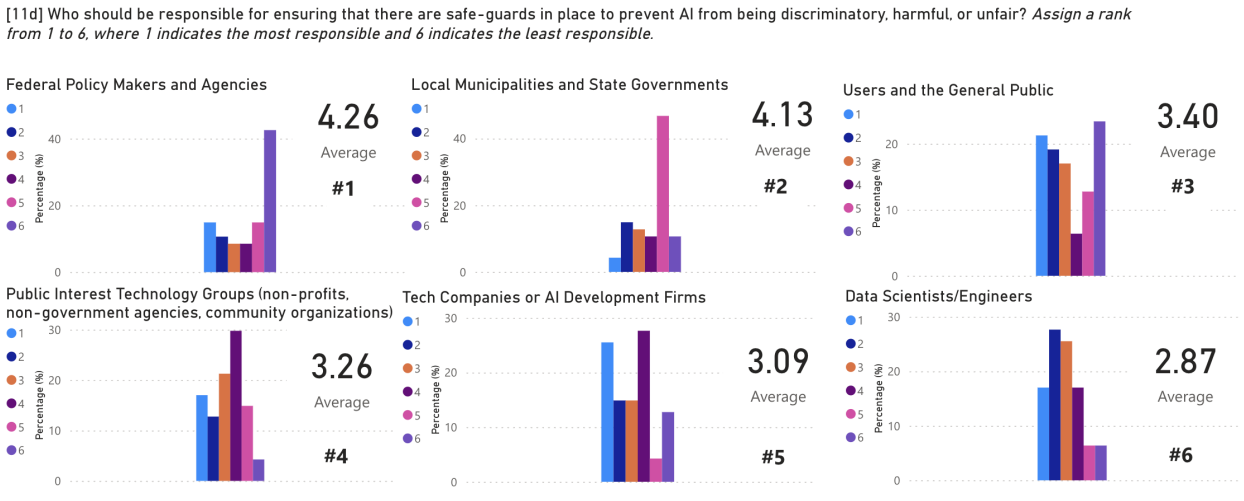


Figure 4.8: Presumed Responsibility for Safeguarding Against Adverse AI

In order of importance ranked, survey respondents indicated who should be responsible:

1. Federal Policy Makers and Agencies,
2. Local Municipalities and State Governments,
3. Users and the General Public,
4. Public Interest Technology Groups,
5. Tech Companies or AI Development Firms,
6. Data Scientists / Engineers.

The survey and focus group discussions involving NLP practitioners revealed a nuanced understanding of and support for AI policy and regulation, specifically concerning the U.S. White House Blueprint for an AI Bill of Rights. Respondents exhibited a range of familiarity with Algorithmic Discrimination Protections, though a significant portion indicated only

slight to moderate knowledge, suggesting a need for broader educational initiatives within the industry. There was strong consensus on the necessity of an AI Bill of Rights to safeguard against biases and ensure responsibility in NLP systems, with the majority deeming it important or very important. The relevance of specific expectations for Algorithmic Discrimination Protections was acknowledged, particularly the need for representative and robust data, accessible design, and proactive equity assessments. Furthermore, respondents identified federal policymakers and agencies as primarily responsible for ensuring AI's safety and fairness, emphasizing a preference for formal, government-led regulation over self-regulation by the tech industry or individual practitioners. These insights collectively underscore the perceived importance of structured and enforceable guidelines, and the need for increased education and awareness to effectively integrate these principles into NLP practices.

**Algorithmic Discrimination Protections**

At the end of this section, survey respondents were asked to **[11e] please share any additional comments or insights you have regarding the AI Bill of Rights Algorithmic Discrimination Protections (ADP) and their practical applicability in NLP data-centric systems.** I additionally analyze the responses from 27 people who opted to share. The open responses reveal a spectrum of insights regarding the perceptions of their practical applicability, importance, and potential improvements

1. Significance and Support for ADP:

    - Support for Ethical Implementation: "I think the ADP are very important, as they help to ensure that NLP systems are not biased or discriminatory. They also help to ensure that NLP systems are used in a way that is fair and equitable for all users." This sentiment underscores the recognition of ADP as fundamental in maintaining fairness and ethics in NLP practices.

- Continuous Improvement: Some responses emphasize the evolving nature of ADP and suggest that while current measures are a good start, ongoing refinement is necessary: "While the ADP are still evolving, I think they are a great starting point for ensuring that NLP systems are developed and used in an ethical and responsible way."

2. Practical Applicability Concerns:

    - Implementation Challenges: Multiple mentions of "practical applicability" indicate that respondents see the implementation of ADP as feasible and crucial, yet challenging. The need for "continuous auditing, transparency in model decisions, and proactive measures in data collection to mitigate biases and enhance fairness" highlights a call for robust, actionable strategies.
    - Concrete Strategies Needed: A respondent suggested a structured approach to pre-emptively address biases: "Maybe it's too much work or just not feasible. However, it might be worthwhile to just allocate some time before the annotation to go through the list and try to brainstorm what we should do as safeguard against potential bias."

3. Skepticism and Concerns:

    - Trust and Influence Issues: "I do not trust the federal government to do the right thing. Corporations lobby much more than people can." This statement reflects skepticism about the effectiveness of government-led initiatives, hinting at the perceived influence of corporate lobbying.
    - International Standards: The idea of an international board to standardize these protections globally indicates a concern for consistency across borders: "There should be some kind of international board that agrees on these blueprints as a worldwide default for artificial intelligence in general."

4. Potential Negative Outcomes: Regulatory Backlash: Concerns about the potential for regulations to drive dissent underground or to inadvertently stifle open-source innovation were expressed: "it's just going to force the people who don't agree with these rights to go underground which leads to black market involvement."

The insights from these open responses suggest that while there is broad support for the ADP, there is also a clear need for more concrete guidelines and methods to implement these protections effectively in NLP systems. The responses also indicate a desire for more international cooperation and standards to ensure consistency and fairness across different jurisdictions.

## 4.6 Discussion

### 4.6.1 Enhancing Fairness and Representation in NLP

#### Training NLP Practitioners on Bias Prevention

This analysis elucidates the deficiencies in practical experience among Natural Language Processing (NLP) practitioners and highlights broader systemic issues contributing to these gaps. The survey revealed a substantial lack of experience in bias mitigation within data training sets among practitioners, with only approximately 23.40% of respondents possessing experience in this critical area. Addressing these deficiencies necessitates structural changes in the organization and funding of NLP projects, along with a revised educational focus to better equip practitioners for these challenges. Significant barriers exist in both workplace dynamics and fundamental data science methodologies, necessitating intentional efforts to enhance practitioners' engagement and capabilities in mitigating biases during dataset production.

Critical AI education and training can foster shifts in human judgment, allowing practitioners to recognize and address areas where bias mitigation is essential. Academic in-

stitutions and skills-based technology training programs should incorporate coursework on societal and critical technology practices. For instance, "CompSci 240: Race, Gender, Class, Computing," developed by Dr. Nicki Washington at Duke University, provides students with the opportunity to explore diversity, equity, and inclusion (DEI) challenges in computing, discussing identity as a social construct impacting computing, organizations, and the public [247]. Similar courses at Johns Hopkins University, the University of Washington, and Harvard University aim to educate culturally competent computer scientists [248]. Concurrently, industry developers producing commercial AI systems could integrate these pedagogical models to enhance proactive bias mitigation capabilities.

### Expanding Diversity Metrics in Data Collection

Metrics for Measuring Diversity: Developing robust metrics for measuring dataset diversity is essential. Further research emphasis could be placed on techniques for mitigating bias introduced during data collection. Simulations and user experience case studies can be used to evaluate the effectiveness of different bias mitigation strategies in various NLP data collection scenarios. How are NLP professionals currently measuring the diversity of their datasets? Are there limitations to these metrics? Can new metrics be developed to provide a more comprehensive picture of dataset diversity? The survey results and focus group findings suggest that developing robust metrics for measuring dataset diversity is essential for fostering representation in NLP practices. However, further research is needed to understand and promote techniques for mitigating biases that are introduced during data collection. For example, simulations and user experience case studies could be used to evaluate the effectiveness of different bias mitigation strategies in various NLP data collection scenarios. Survey and focus group participants identified a range of considerations and strategies could also be further researched.

### Standards for Data Annotation Conflicts

Based on this analysis, it's clear that discussions of data annotation performance must always consider the specific context of a project or domain. The amount of time dedicated to resolving data annotator conflicts offers a revealing metric within the pursuit of representation and inclusion in NLP. These results illuminate the need for prioritizing conflict resolution, investing in collaborative processes, and developing clear guidelines to foster truly fair and inclusive NLP datasets and systems. The field of NLP would benefit from efforts to collate and share best practices regarding metric development and performance measurement. This would help strike a better balance between project-specific needs and industry-wide expectations of quality data annotation.These findings illuminate the necessity of allocating adequate resources and time to conflict resolution in data annotation processes. Such practices are crucial for enhancing the representation and inclusion of diverse user groups in NLP datasets. By investing in rigorous quality assurance processes and actively engaging with diverse annotator perspectives, NLP technologists can mitigate biases and improve the generalizability and fairness of NLP systems. This approach aligns with broader objectives within the field of AI and ML to promote fairness, accountability, and transparency, particularly as these technologies increasingly influence various aspects of societal functions.

This analysis shows that discussions of data annotation performance must consider context. In this case, time dedicated to resolving data annotator conflicts offers a metric that indicates responsibility in NLP. These results stress the need for prioritizing conflict resolution by investing in collaborative guidelines for inclusive NLP datasets and systems. Sharing best practices regarding metric development and performance measurement would help the field better balance project-specific needs and industry-wide expectations for quality data annotation. Allocating adequate resources and time to these practices are crucial for enhancing the representation of diverse user groups in NLP datasets. The results also suggest that by actively engaging with diverse annotator perspectives, NLP technologists can mitigate

biases and improve the generalizability of fair NLP systems. This approach aligns with the AI and ML fields' objectives of promoting fairness, accountability, and transparency as these technologies increasingly influence society.

### 4.6.2 Strengthening Trust and Equity in AI

#### Accuracy, User Trust, and System Efficacy

The collective findings from the survey and focus group discussions on considerations toward representation and inclusion within NLP data practices suggest a multi-dimensional understanding of the responsibilities and challenges faced by technologists in the field. These findings imply that NLP/ML technologists recognize the importance of and are actively considering strategies for representation and inclusion. However, they also highlight that realizing these goals is a complex endeavor that involves addressing both ethical considerations and technical challenges. The variance in definitions of data quality and the absence of industry-wide standards for evaluating systems suggest a need for more uniform best practices and benchmarks. This would help ensure that efforts toward inclusion are consistent and measurable across the industry. For practitioners and teams, this means adopting a comprehensive, holistic approach to data practices—from initial data collection to the final stages of model evaluation and deployment. This also entails collaboration among various roles within organizations and the industry at large to develop standards and protocols that can guide and assess these efforts.

The survey and focus group findings regarding representation and inclusion in NLP data practices suggest a multi-dimensional understanding of the challenges faced by technologists in the field. These findings imply that NLP/ML technologists feel responsible for and strategize toward representation and inclusion. However, the findings also imply that this complex endeavor involves both ethical considerations and technical difficulties. Varied definitions of data quality and the absence of clear evaluative standards suggest a need for industry-wide

guidelines and best practices. As previously discussed, these would help ensure that efforts toward inclusivity are consistent and measurable. For practitioners, this means adopting a comprehensive approach to responsible data practices—from initial data collection to the final stages of model evaluation and deployment—while collaborating within and across organizations to further develop standards that can guide and assess efforts toward inclusivity.

**Equity-centered Collaboration with Communities**

The findings suggest that while implementing structured involvement of diverse communities is perceived to enhance the fairness, accountability, and overall effectiveness of NLP systems, there is inconsistency in how these practices are advocated for across project roles and stages of development. One way to foster accountability and trust with diverse community stakeholders would be to launch community advisory boards (CABs) for technology design and development. For example, one survey respondent reported that they proposed a "community advisory board to identify Indigenous conceptions of health in clinical notes." CABs have also been leveraged to build equitable algorithms in consultation with racial and ethnic minority participants [153; 154]. In the private sector, tech firms have begun to implement forms of external community advisories, such as Google's Equitable AI Research Roundtable(EARR) [249], Meta's Safety Advisory Council, and Microsoft's Aether. However, I see a missed opportunity for these companies to also engage with racial and ethinc minority community members in areas of AI development that impact their communities in the specific ways that only they can give voice to, perhaps through mechanisms discussed in the following Chapter 5. Toward these ends, NLP practitioners could launch participatory design projects with the guidance of CABs: for instance, to Collaboratively Mitigate Racial Disparities in Automated Speech Recognition and Language Technologies with African American English Speakers [78].

The findings suggest that while there is a recognition of the value of involving diverse community members in NLP projects, there is variability in the implementation and con-

sideration of such practices across different roles and stages of project development. Advocating for and implementing structured involvement of diverse communities can enhance the fairness, accountability, and overall effectiveness of NLP systems. These insights could be instrumental in guiding future policies and frameworks within the field to standardize inclusive practices across the NLP project pipeline. In the private sector, the decision to involve external community members often rests with project managers, data engineers, and corporate executives who may prioritize cost efficiency over quality. The perception of data work like annotation as low-skill work can influence these actors to opt for gig or contract workers, possibly at the expense of investing in time to train community-based experts in data annotation to translate knowledge into data-points. One way to engage diverse community stakeholders while fostering accountability and trust, would be to launch community advisory boards (CAB) for technology design and development. As one survey respondent shared, "I recently proposed work to bring together a community advisory board to identify Indigenous conceptions of health in clinical notes." The implementation of community advisory boards (CABs) have been used to build equitable algorithms with participation among racial and ethnic minorities [153; 154]. Tech firms have begun to implement forms of external community advisories such as Google's Equitable AI Research Roundtable (EARR), Meta's Safety Advisory Council, and Microsoft's Aether. But the missed opportunity here is the intentional engagement of localized socio-cultural community members in areas of AI development that uniquely impact their communities. Teams could launch participatory design projects for NLP with the guidance of a CAB, for instance to Collaboratively Mitigate Racial Disparities in Automated Speech Recognition and Language Technologies with African American English Speakers [78]

In academia, the involvement of external community members might be influenced by principal investigators, research coordinators, and grant committees.Typically, academia and research organizations have more flexibility and less constraints to partnerting, engaging, and collaborating with external community members. Factors such as intellectual-property, or-

ganizational constraints, etc. don't impact these institutions' ability to freely engage others. This makes the opportunities for developing collaborative technology development efforts like a community advisory board (CAB) more feasible. For instance, the Michigan Center for Urban African American Aging Research (MCUAAAR), a joint initiative between Wayne State, Michigan State and the University of Michigan. Faculty leaders, staff, and the Community Advisory Board members work together to improve the health of older African Americans in Detroit through a combination of education and collaborative research. Additionally, efforts like the Black Community Research Council on Technology Equity, Accountability, and Interest at the University of Washington Human Centered Design and Engineering is yet another example of CABs at work. The B-CAB is a Seattle-based coalition of external community-based organizations and civic leaders who collaboratively explore the opportunities and challenges confronting the Black community within technology practices, advising on community-engagement, data and research efforts, and implications of work at the UW. Collectively, the council engages in dialogue, promotes action, and envision solutions toward making technology more inclusive and equitable.

**Engaging with AI Policy and Governance**

The insights derived from survey responses and focus group discussions from NLP practitioners regarding AI policy and regulations, particularly those associated with the U.S. White House Blueprint for an AI Bill of Rights, present a compelling narrative about the evolving interplay between AI technology and public policy. These findings reflect broader themes discussed in academic literature, emphasizing the need for robust governance frameworks that balance innovation with ethical considerations.

- Integration of AI Policy and Practitioner Responsibilities: Survey findings, particularly from questions 11a and 11d, reveal a notable variation in familiarity with Algorithmic Discrimination Protections (ADP) and a strong consensus on the responsibility of fed-

eral policymakers in ensuring AI's safety and fairness. This aligns with discussions in AI governance literature, which argue for the critical role of government in setting clear, enforceable standards (Araya, 2018; Wachholz, 2020). The preference for government-led regulation over industry self-regulation suggests that NLP practitioners are cognizant of the limitations of corporate governance in addressing ethical challenges autonomously, echoing concerns about corporate lobbying and trust highlighted by respondents in open responses to 11e.

- Practical Implications and Global Standards: The practical applicability of ADP, as discussed in responses to 11c and 11e, illuminates the urgency for actionable guidelines that can be directly implemented by practitioners. The literature on ethical AI, such as works by O'Neil (2016) and Eubanks (2018), supports this need by illustrating the potential societal harms of unregulated AI. Respondents' emphasis on continuous auditing and proactive bias mitigation reflects a desire for dynamic, ongoing engagement with ethical practices, which is essential given the rapid evolution of AI technologies.

Furthermore, the call for international standards and cooperation, as suggested by the desire for an international board in response 11e, resonates with UNESCO's recommendations for global ethics in AI. This perspective acknowledges the borderless nature of digital technologies and the importance of a harmonized approach to prevent discrepancies in AI governance that could lead to uneven impacts across different populations.

- Public Interest Technology and Collaborations Among Various Stakeholders - Industry, Government, Academia, and the Public: The complexity of implementing ADP in everyday practice, illustrated through responses to 11b and 11c, highlights the gap between theoretical policy frameworks and practical execution. This gap can be bridged through strengthened collaborations between industry and government, an approach supported by literature advocating for public-private partnerships as a means to foster

both innovation and ethical compliance (Crawford, 2021). Additionally, engaging a broad range of stakeholders—not just technologists but also end-users and the general public—is crucial in developing AI systems that are socially acceptable and ethically robust (Freeman, 2010). Technologists can get involved with civic technology efforts in their communities external to their workplace.

For example, the ALCU-W launched a Technology Equity Coalition (TEC) which is a group of civil liberties and civil rights-focused organizations and individuals working to hold technology accountable and uplift the voices of historically marginalized communities in decisions about technology. As a coalition member, technologists can support bringing awareness to technology implications based on research and experiences, testify in front of state and local legislators, provide public comment to city council members, host educational workshops, write letters, and engage in advocacy. These efforts often have a hyper-local impact at the municipal and state levels, working to mobilizing allies and the public to fight against the deployment of harmful AI technologies like banning surveillance technology in cities, and regulating government use of AI decision making at the state level.

### 4.6.3 Methodological Reflection

This study design leveraged mixed-methods research approaches in the data collection, analysis, and interpretation of the research questions outlined for investigation, which included: surveying, focus group dialogue session, and concurrent focus group data analysis [198, cf.]. As discussed in the methods reflection in Chapter 3 (3), mixed-methods research approaches often take a pragmatic worldview, where the researcher can traverse post-positivism (quantitative), constructivism (qualitative), and even transformation (qualitative) in their interpretation of a research problem [198]. Within HCD, qualitative, quantitative, and mixed-methods research approaches can all be used, and in this section I will elaborate on my

choices and experiences with regard to the design approaches for this study.

My decision in selecting my research approaches were largely informed by the aim and unique angle of the research problem – understanding how ML technologists' design decisions and data practices for NLP systems impact fairness, representation, and bias, particularly among African American English (AAE) speakers. This project uniquely focuses on NLP/ML technologists as study participants while highlighting the indirect impacts and implications for Black/African American users of NLP systems who communicate through AAE speech-to-text input. Previous research has examined Black AAE speakers' experiences with various NLP systems and technologies, including automated speech recognition (MSR study), code-switching speech for Apple's Siri [13], perceptions of AI-supported writing tools like ChatGPT (Basoah et al., 2024), and broader experiences with voice-enabled technologies (Wassink and Cunningham, 2024). Collectively, these studies, along with other literature, have informed my understanding of the racial and linguistic inclusion disparities in contemporary NLP systems and technologies.

Rather than conducting another study on this specific topic, I aimed to explore how these disparities manifest within NLP data practices, a critical development step in designing systems and technologies that present challenges for AAE speakers and other underrepresented user groups based on race/ethnicity and language variety. Consequently, the methods employed in this study are designed to broadly conceptualize NLP technologists as participants who are part of a professional community involved in NLP system development. Although broadly applicable, the findings and discussions of this research can inform how inclusion might be further operationalized for AAE speakers who use or are affected by NLP technologies. This approach aims to provide a comprehensive understanding of the indirect impacts on Black/African American users and contribute to developing more inclusive NLP systems.

The primary instrument for data collection in this study was a comprehensive online survey incorporating both quantitative and qualitative questions. Individuals eligible for the survey were referred to as "respondents" to distinguish them from the anonymous "partici-

pants" in the subsequent focus group phase. The decision to use a questionnaire was driven by the scalability of outreach, recruitment, and engagement. In my experience within large tech companies such as Oracle, Meta, Microsoft, Apple, and Google, technologists are less likely to participate in academic research if it appears burdensome or time-consuming. Additionally, incentives need to be compelling or commensurate with the level of participation requested. This study aimed to capture a broad range of technologists' feedback to balance the participant pool across various experiences, technologies, and personal demographics. Given the high earning potential of many technologists, compensation was not always a significant factor for participation. Thus, I opted for a raffle model, awarding one Amazon gift card to five randomly selected survey respondents, to conserve the research budget.

As discussed in the Methods section, questionnaires as a data collection method have inherent limitations. While they are useful for gathering broad mixed-methods insights, challenges include potentially non-representative sample sizes, biased data based on recruitment strategies, and subjective data due to self-reporting. To mitigate these issues and gain deeper insights, I complemented the survey with virtual focus group interviews, which will be elaborated upon in the following passage. Although questionnaires are commonly used in quantitative research for statistical and inferential data reporting, this can be limiting when attempting to draw integrable research claims. Therefore, I included a number of open-ended and multi-select questions informed by the study's topics and descriptive in nature. This approach aimed to guide respondents through a scoped framework, allowing them to elaborate on their opinions or answer selections. Several questions prompted respondents to provide additional context through text boxes. While I do not view questionnaires as transformative research methods, I argue that the overarching topic can be oriented toward social change. In this study, I address methods, practices, and strategies for developing inclusive NLP technologies through diverse human-centered data science practices. The findings inform socially concerned NLP technologists about the landscape for more equitable design practices and inclusive user experiences for NLP systems.

The secondary instrument for data collection within this study was a focus group of NLP technologists who engaged in sustained dialogue about the data insights from the previous survey. As previously mentioned, I find predominately quantitative questionnaires for survey studies to be limiting in offering descriptive and qualitative detail. When designing this study, I knew that there was a unique advantage in involving NLP technologist through a participatory approach. And while participatory research methods vary on a continuum [134], an anonymous expert focus group was an opportunity to involve these technologists as stakeholders in the very problem at hand. Some disciplines have referred to this method as a Delphi-study, which offers slightly different procedures due to it's advent for statistically significant consensus among participants; this was not my aim. My hope was to use the focus group participants' quotes as further descriptive data either through story-telling or share-outs, common techniques used in participatory research workshops in HCD. Moderation techniques for focus group research methods can vary based on the preference and goals of the researcher. Through my many civic and professional experiences in facilitating inter-group sustained dialogue, I leaned into applying the peer moderator framework developed by The Sustained Dialogue Institute, which I expand on in later sections of this text. I have roughly 7 years of experience in practicing and moderating inclusive dialouge across communities of difference toward a common goal to achieve shared understanding, representation, and respect. In developing the facilitation protocol for the focus group among 5 participants who were also questionnaire respondents, I adapted activities from the SDI Moderator Manual (2021). This ensured that the focus group was a high-quality and arguably transformative experience among participants, as their responses were not also valued, but also their sense of self.

In addition to utilizing focus groups as a data collection method, they were also employed for study data analysis. This approach was deemed innovative by my graduate research advisers, as participatory data analysis is uncommon in Human-Computer Interaction (HCI) research. Typically, co-design or co-research workshops may include some elements of par-

ticipatory analysis, but it is rare for survey study respondents to be directly involved in data analysis. Dissemination of results usually informs respondents of study contexts, leaving little room for democratic sense-making among individuals who might interpret data through casual knowledge. As a researcher with expertise in the area under investigation, my experiences inform my ability to interpret this study's data. However, I contend that my subjective interpretations do not constitute absolute truth. While I aimed to involve five focus group participants in data analysis, their perspectives, though grounded, are also not absolute. This approach allowed for aligned interpretations that support and validate my research claims. Furthermore, during the final draft of this study's findings, the report was shared with the five focus group participants for peer review and feedback, ensuring equitable representation of their views.

Ultimately, the methods used in this research study were acutely human-centered and participatory. The findings offer compelling insights into how NLP systems can be developed and deployed more responsibly. Researchers and technologists in AI may leverage the methods, practices, and strategies outlined in this study to be geared towards achieving more equitable system designs. The adage "garbage in, garbage out" aptly describes the importance of quality in both data and research practices. Whether it involves data quality or conceptual and applied practices in data science, this study emphasizes the necessity of responsible approaches in the development of data-centric AI systems.

## 4.7 Conclusion

This study critically examined how NLP/ML technologists' decisions regarding research and data design impact fairness, representation, and bias, particularly among linguistically and ethnically diverse user groups. Through a mixed-methods approach combining surveys and focus groups, I explored the perceptions and practices of NLP practitioners on data integrity and bias mitigation. These findings highlight significant challenges in current data practices,

underscoring the need for more inclusive and equitable methodologies.

The insights gained reveal the crucial role of technologists in shaping AI systems and emphasize the necessity for participatory design and enhanced governance to ensure that AI development aligns with ethical standards and societal values. Furthermore, the study underscores the importance of regulatory frameworks like the U.S. White House AI Bill of Rights in guiding fair and transparent practices. By addressing the gaps between theoretical frameworks and practical implementation, this research contributes to the ongoing dialogue on creating trustworthy, fair, and inclusive AI systems, advocating for a shift towards more responsible AI practices across the field.

# Chapter 5

# Co-Development of Socially Responsible Research through Black Community Advisory: An Introspective Essay

This dissertation seeks to contribute to methods of justice-oriented design in data-centric technology innovation. In the previous chapters, I have described two research studies that have both direct and indirect implications for African American users. In this final chapter, I elaborate on my journey to pursuing this work, as well as my personal thoughts and experiences on the methodological approaches used and developed. In so doing, I take a step back to provide myself room for valuable reflection, which I see as a vital practice for any socially-concerned designer. This reflection guides readers chronologically through my dissertation work and the motivating factors that lead me to the point of this final reflective analysis. Community building has been at the core of my personal, civic and professional career values. Much of my life's work has sought to bring people together to

democratically uplift and aid humanity through addressing a range of social issues, political topics, and, seemingly now, technological artifacts. In this chapter, I'll share how my own lived experiences have influenced my practices in research from a personal and communal perspective,

## 5.1 Student transplant turned civic technology researcher

I moved to Seattle, WA in January 2020 to start my Ph.D full-time at UW HCDE. Growing up in Mississippi and moving from Alabama, I was used to being around large communities of Black Americans. I knew that in coming to Seattle I wanted to immerse myself among local Black people and within neighborhoods. I found myself landing in Seattle's historically Black neighborhood - The Central District (CD). The legacy of Seattle Black community leaders and pioneers is profoundly connected to the CD and neighboring communities on the Rainier Valley south-end. From Black churches, soul-food and Ethiopian restaurants, and an abundance of other Black-owned business and community spaces, the CD has been the epicenter of the Black experience in Seattle. In the early days of my Ph.D I was doing everything I could to connect with people and build community and connections in the city. I found myself attending a number of social and civic events, specifically centered around Seattle's Black communities, which was honestly a bit hard to find. From beginning, it was apparent that Seattle was not particularly diverse when it came to underrepresented ethnic minorities, and Black communities made up only a small percentage of the local population. However, because my professional career as a Ph.D student and academic was also intertwined with my personal identity as a Black American man, I found it really important to be rooted in my communities outside of my academic life.

**2020 Impact on Research** : COVID-19 Pandemic and Black Lives Matter (BLM) Movements In the Winter and Spring of 2020, I along with the rest of the world witnessed the

COVID-19 global health pandemic. It was a historic event that exposed and exacerbated many of the health disparities that already existed for historically marginalized and vulnerable populations of people. In the U.S., this was especially pronounced for Black American people, especially though living in rural or healthcare deficient neighborhoods. These racial and health disparities have largely been connected to social injustices and determinants of health, life, and well-being. At the same time, Black American communities were grappling with another pandemic: the systemic violence enacted on Black people through police brutality. The murders of George Floyd, Breonna Taylor, and other Black Americans at the hands of law enforcement officers underlined the reality that even in the face of a global health crisis, racial injustice and violence against Black bodies continued to permeate the society, as it still does.

As I struggled to manage my transition to the Pacific Northwest (PNW), which is notable in its lack of ethnic diversity among Black Americans, I sought refuge in the Seattle Black community through activism and engagement with various Black non-profit community-based organizations (CBOs) and civic community groups. A number of organizations such as King County Equity Now (KCEN), formed to combat inequity and organize social movements toward liberation of local Black communities from systemic racial injustices. While I was fairly new to the Seattle, King County community, the collective power in organizing hyper-locally swiftly opened space for me to take action with my neighbors. Even as a researcher at a PWI, I couldn't disentangle my own Black identity and the social implications thereof, with a group of people, or in HCI terms *users*, that also experienced inequities through technologies.

Given the impact on this movement, I was convinced that more attention needed to be directed toward the design of socially just technologies with the capacity to positively impact black people. While I can't necessarily speak for the climate of Seattle's Black community before 2020, the city has a long-standing history with racial red-lining, displacement and disenfranchisement of Black American residents. Black Lives Matter (BLM) as a transformative

movement for social justice and change, empowered communities, institutions, and government agencies to take strategic action to combat racial inequity in the U.S. and in nations across the globe. Even within research organizations like the University of Washington, many scholars turned their attention to studying racially intersecting aspects of science, health, medicine, and technology to advance equity for Black people. This intense wave of attention propelled many efforts to make strides alongside Black people and communities. And while this advent contributed to increased financial resources and funding, such as UW's raising of nearly $2M to endow the Black Opportunity Fund, social justice research and activism had been a long-time concern of many well before the BLM movement. There was something of a sense of frustration that issues of Black racial equity, which so many, including myself, had already been organizing for, were perhaps only getting mainstream recognition as part of a social-media-driven social justice trend. Nonetheless, I saw this moment as an opportunity to capitalize on and champion Black-community centered technology research.

**Pursuing Black Community Centered Technology Design** In the Autumn of 2020, I began to lead my own research in HCDE and I became interested in studying Black user experiences and the impacts of innovation within technology research and design. This was something that was deeply personal to me as the first Black American man in the HCDE Ph.D program. At the time, I noticed there to be a lack of scholarship and research within my own HCDE community on Black people in technology, and I found it to be somewhat of a calling, a personal passion. For me, it was not only about expanding knowledge on the Black user experiences and impacts of technology, but also a cause in which I have personal stake, as do my family, loved ones, and generations to come. I recall when I initially told one of my PhD advisors that I wanted to do a research project on Black users as participants, and she shared with me that in her experience it had been distinctively challenging to recruit Black people for academic research studies, and that I might have an easier time doing a study in which I conveniently sampled participants. But this was something that I felt up

to the challenge for.

In pursuing this goal, I found it to be one of the greatest focal points I could ever make as a researcher in HCDE. As a technologist, I was well aware of the issues that technology had on Black users and people. The very first research study was centered on the experiences of Black American users in Cash App [158], where I studied implications of fintech design on historically marginalized user groups. And I remember when I began recruitment for this study, I got nearly 400 prospective participants to complete my recruitment survey. My advisor was completely amazed at the volume of responses that my recruitment survey garnered.

In my personal life outside of academia, I have heavily prioritized community and network building. During my first three years at the University of Washington (2019-2022), I realized that being Black in Seattle's tech industry entails not only engaging closely with the tech ecosystem but also understanding the unique experiences of Black professionals and the relevance of technological applications for Black users. The city of Seattle and State of Washington are places that I have found to be equity-forward, *or at least they try to be.*, offering a more inclusive environment compared to my experiences in Mississippi and Alabama, where Black populations are more prominent. The thriving economic ecosystem in Seattle has facilitated advancements in equity and empowerment for Black communities through social justice initiatives and tangible resources. The city hosts a robust network of Black-led community groups and organizations that advocate for and empower local Black residents. My involvement in many of these initiatives has highlighted the persistent disconnect between technological innovation and the representation and impact of Black individuals in these spaces. Nevertheless, Black communities have long led in self-determination and social justice advocacy, predating the modern proliferation of technology.

## 5.2 My beginnings with civic leadership and community engagement

Before my transition Seattle for the HCDE Ph.D program, I'd had a pretty extensive history of civic leadership and community engagement in my home community of Lowndes County, MS and during my time as an undergraduate student at The University of Alabama (UA) (2016-2019). As a Black man, native to the deep U.S. South, legacies of social, institutional, and systemic injustices were all too familiar to me and family. Growing up in Mississippi and initially attending college in Alabama immersed me in a history distinct to people and places who'd been affected during the Civil Rights Era. I remember how my grandparents would share their stories and those of their forebears passed down through generations about the mistreatment of Black people and other minority groups in the very communities in which we still resided. One thing that they were always firm on, however, was the power of community, love, and empathy in the pursuit of social justice. One thing I'd always admired about the elders in my family was their ability to express how essential it was to "love they neighbor," even when said neighbor didn't always treat you with dignity and respect. And from a young age, I've always been involved in community-building in some capacity; and not just in my own, but across dimensions of geography, racial identity, sexuality, and social statuses. Whether it was founding student government in middle and high school, organizing and participating in peaceful demonstrations among youth in my hometown, or championing efforts to donate to unhoused persons and families – loving my neighbor has been at the center of it all.

When I went to college in Tuscaloosa, AL, I instantly sought out opportunities to be engaged in the local and UA campus communities. From my freshman year, to my final senior semester, I carried with me the unwavering commitment to the people whom I was in community with. And as an engineering student, this at times could feel contradictory to what I was being told in the classroom was important. While engineering practices prioritized

discrete logic and positivist thinking, I found myself always compelled by social dynamics and the intersection of people with these systems, and the idea of systems is something that I've thought of not only as a technical artifact, but also as social and institutional structures. So, when I wasn't consumed by my computer science education, I was immersed in community through student involvement and leadership.

One experience that was and has remained a catalyst for how I seek to bring people together is of my experiences of facilitating sustained dialogue and practicing inclusive engagement among campus communities to address social and political issues in an democratic fashion. This was streamlined through my experience as a moderator and organizer of Sustained Dialogue (SD) workshops, a change-making process created by Dr. Hal Saunders, administered through the Sustained Dialogue Institute (SDI). The SDI is a non-profit organization which helps people to transform conflictual relationships and design change processes around the world through an approach which increases understanding and greater commitment to collaborative lasting community action. This program was offered to students at UA in which I initially joined as a dialogue group participant among other students with differing identities and perspectives. I eventually became a peer-moderator, which served to guide dialogue through the SD approach among those who I was in community with. The SD approach focuses on relationships and it differs from other change-making processes through its focus on understanding the nature of community relationships, which are often the "problem behind the problem". Individuals carry culture and stories that ultimately shape national behavior or institutional culture. SD reaches beyond formal institutions to include "whole bodies politic"—everyday community members as well as formal leaders.

The SD method for changing society is to focus on the five elements of relationship:

1. Identity - How a person or group defines using their own words; the sum total of their experiences.

2. Interests - What individuals want, care about, value, and need, whether material or

non-material.

3. Power - Not just the capacity to control resources, but the ability to make change or influence alongside others.

4. Perceptions - What we assume rightly or wrongly about others' choices or identities; our own stereotypes.

5. Patterns of Interaction - The expected rules of how individuals and groups relate, whether positively, negatively, or not at all.

Originally developed in the contexts of addressing deep-seated issues around race relations and diplomatic peace, this process is outlined in five-stages, which I've found to be so critical in stewarding social relationships and communities:

1. The Who: Deciding to Engage - People living with systemic civic challenges decide to engage in dialogue as a way of improving community relationships.

2. The "What": Mapping and Naming - Participants come together to share personal experiences and to map and name challenging community relationships. This stage ends when the group agrees, "What we really need to focus on is. . . ."

3. The "Why": Probing Problems and Relationships - In more disciplined talk, participants probe specific systems and uncover dynamics of relationships at the root of community challenges to: (1) define the most pressing problems; (2) identify possible ways to change them; (3) come to a sense of direction; and (4) weigh the consequences of moving in that direction against the consequences of doing nothing.

4. The "How": Scenario Building - Together, participants design a scenario of interrelated steps to change troublesome relationships and to engage others. They ask five

questions: What resources do we have? What are the obstacles? What steps could overcome those obstacles? Who could take those steps? How can we sequence those steps so that they build on another to generate momentum behind the plan?

5. The "Now": Individual and Collective Action - Participants devise ways to put that scenario into wide effect. Action can take a variety of forms: it can be collective or individual, involve outsiders to the dialogue group, center on creating awareness, engage administrators or faculty, etc.

As a student leader and design justice organizer, I've had the privilege of moderating and organizing SD experiences for students, faculty, and staff at The University of Alabama and University of Washington HCDE. In both experiences, I have facilitated small-group workshop dialogues in deeply divided communities to design sustainable approaches to social and political changes centered on topics of identity, interests, power, perception, and patterns of interaction. I share this to vividly illustrate that my desire to center community engagement and voices has extended beyond critical theories of implementation, but also to transformative practical experiences that directly work toward social design justice.

## 5.3 Applying the Sustained Dialogue Approach to Facilitate Community-based Participatory Research and Design in Technology

Around the time of my comprehensive General Exam (spring 2022), I began to critically assess my own positionality and capacities to foster equity-centered, community-based, participatory approaches in designing justice-oriented technologies. At this point, I theorized that the SD approach was a process in which the stewards of technology and those communities of users disproportionately affected could collaboratively experience. Thus positioning

this approach as a method that responsible designers and civic participants can undertake in the paradigm of human-centered design processes to collaboratively develop a common body of knowledge and take action toward technology experiences and outcomes that are more just. In field of HCD, we are familiar with participatory design (PD) approaches as a method for technology innovation, whether it be research or practical design. But at times, what is undefined is *how* we as design researchers should go about doing this. We often facilitated co-design workshops, which themselves can be riddled with uneven power dynamics. And after my very first PD research project [122], I began to search for ways to more meaningfully engage user communities with designers of technology. I have taken what I have learned in SD with moderating dialogue groups among diverse people who I am in community with on relevant social topics; to applying the framework of SD to advancing community-based participatory design methods among technology designers and specific groups of users, who collaboratively innovate in and through community.

**Applying the Sustained Dialogue Approach to Facilitate Community Advisory in Participatory Research and Design** In HCD, methods are at the core of how we choose to research, design, build, or simply imagine technological innovations. This is what sets this disciplines apart from traditional ideals found in hard engineering or sciences. As I explored methods in accountable community participation in design, it has been evident that mechanisms such as community advisory boards (CAB) for technology design, hadn't been widely standardized in HCI research and scholarship. In my initial desire to employ such mechanisms in the UW HCDE Department, I found there to be a lack of frameworks on fostering this caliber of an approach. I began to solicit feedback from peers within the HCDE research community on whether anyone had developed a CAB in their works. While interested in the concept, most people had not operated such a level of participatory involvement before.

There were only two-people who I found to have developed some form of community

advisory for their research. Calvin Liang and Akeiylah DeWitt, whom were both Ph.D student colleagues in Dr. Kientz's Computing for Healthy Living and Learning Lab shared that they each pursued this. They both shared that they developed CABs to guide their doctoral research with the communities at the center of their investigations focused on one specific project or topic. Calvin's CAB was composed of transgender and gender-expansive youth across the U.S. to co-design and evaluate an Online Interactive Sex Education Tool (OISET). Akeiylah's CAB was composed of local Seattle parents to guide and advise her research on culturally-safe technologies to support child development. What Calvin and Akeiylah both shared was that their motivation for implementing a CAB in their works was out of respect and value for the people which they were researching technology implications on. We collectively agreed that there was a lack of scholarship within HCI which outlined participatory methods for CABs in research and furthermore tool-kits to facilitate such design workshop experience could be insufficiently matched for the aspirations of outcomes. In response, they each stewarded this in their own ways with little guidance from other researchers in HCDE. For me, this was yet another sign that there was an opportunity to introduce CABs within the field of HCI and that SD could be an ideal approach for the goals which I and prospectively involved community participants would be able to leverage toward justice-oriented and change-making technology design.

## 5.4 UW HCDE Black Community Advisory Board

As a university-affiliated professional—whether as a graduate researcher, faculty member, or departmental staff—I represent an institution of higher education and learning. Public universities like the University of Washington (UW) hold inherent significance as places meant to spark creativity and intellectual provocation. These institutions are built on a foundation of public interest and trust, funded by taxpayers. Within this framework, I segment my praxis of equitable community engagement and partnerships between researchers


Figure 5.1: UW HCDE B-CAB Banner

from private companies and public universities. This segmentation has led me to explore collaborative computing technology research and development among universities and hyper-local minority group community-based organizations (CBOs).

In this initial pursuit, I encountered a scarcity of resources guiding how an academic researcher could leverage a community advisory board (CAB) as a Community-Based Participatory Research (CBPR) method in computing research and technology design. My extensive searches through the ACM Digital Library, Google Scholar, and the UW Library yielded no pertinent literature from my research disciplines. While much research exists on participatory design approaches in Human-Computer Interaction (HCI)—utilizing mechanisms like design workshops, focus groups, and other momentary interventions—these were not the methods I sought. My understanding of the field revealed that CABs had not been adopted as a methodological approach in human-centered technologies research communities.

Expanding my search beyond my discipline, I discovered the prevalent use of CABs in fields such as community/public health, civic sciences, and social work, where human studies and interventions are used more frequently. This gap in Human-Centered Design and Engineering (HCDE) research presented an opportunity to link interdisciplinary literature and develop what seemed to be a novel method for my discipline. However, I quickly realized that my task extended beyond merely applying CABs as an accountable research method. I was also responsible for developing the foundational steps for researchers to responsibly

use the method and outlining practices of data analysis suitable for scholars and community member participants in CAB studies. In this dissertation, I aim to guide the responsible researcher through the process I undertook to develop a CAB, laying the groundwork before any relevant research on computing topics commenced.

### Fostering Community Partnerships: Building Foundations to Initiate Hyper-local Community-Based Participatory Research

The following section is focused on practices of equitable engagement with Black community organizations in the Seattle, WA area. In reflecting on my role as a university researcher, I've found it to be essential to be thoughtful in cultivating meaningful relationships among CBOs before launching a CBPR effort. This has been very significant in seeking to engages with groups who represent historically marginalized people like Black Americans. Productive and non-exploitative collaborations should commence with building trust, rapport, and shared goals for equitable partnerships among university researchers and Black CBOs. In the following sections, I will outline the 10-steps that I have taken in co-developing a framework for the launch of a Seattle Black Community Advisory Board at the University of Washington Department of Human Centered Design and Engineering:

1. Understanding community-based participatory research (CBPR),
2. Identifying issues relevant to local Black communities as it pertains to technology impact,
3. Establishing university researcher's (UW) goals and priorities in partnering,
4. Outlining university researcher's (UW) capacities and resources to support council,
5. Identifying local community organizations whose missions align with the advancement and advocacy of Black people,

6. Developing an outreach plan,

7. Building trustworthy relationships with local community organizations,

8. Offering and inviting requests of resources, support, and compensation,

9. Inviting prospective community partners and their representatives to join the advisory board.

**1) Understanding community-based participatory research (CBPR)**

Understanding dynamics of CBPR is something that I found to be fundamental to pursuing equitable partnerships with community members. And while academics have been rooted neighborhood communities local to their institutions, it doesn't mean that we're engaging with the people are native to those locations. Furthermore, those of us who are apart of disciplines that conduct human-subjects research, are often faced with the ethical implications of our works, which have systematically, alibiet loosely, garnered oversight of our works through institutional internal review. In his book "In the Shadows of the Ivory Tower", Baldwin [250] raises a question for readers to consider, asking "what might it look like for universities to link arms with local communities?" When considering the power and positionality that I hold as an academic researcher, I find this question to be an inquiry that I must be faced with. This contributed to my own introspection in considering **why** and **whether** I should look toward CBPR as the practice in which I chose to link with local Seattle community members and organizations. Quite frankly, I would argue that any academic who is interested taking up methods of CBPR, must first know what this practices entails and understand methods associated with it. Furthermore, it is even more important to know **who** are the communities of people you seek to engage and **what** are your intentions are through conducting CBPR.

**2) Identifying issues relevant to local Black communities as it pertains to technology impact**

In Seattle, Black community-based organizations such as the Africatown Community Land Trust, the NAACP, the Metropolitan Urban League, the NPHC Divine-Nine (Black Greek-letter organizations), King County Equity Now, and the ACLU-WA have been instrumental in positively impacting Black communities. My engagement in these spaces, whether as a formal member, volunteer, or community participant, has facilitated meaningful connections with neighbors, allowing me to share my work and learn about its applicability to their lives and the communities they serve. These interactions have provided a deeper understanding of the implications of technology for Black communities, often emerging organically from daily life rather than through intentional research endeavors. This experiential knowledge contrasts with the context provided by my professional and academic research communities.

Collaboration with peers within my discipline reveals that not everyone shares my identity or lived experiences but often shares a commitment to promoting a technological landscape that benefits historically marginalized communities. Seattle and King County's digital equity initiatives, aimed at advancing technology within underrepresented minority communities, reflect a commitment from both community members and local governments towards a more equitable landscape. However, within this framework, a disconnect persists between the University of Washington (UW) and local Black community issues regarding technology innovation. As an institution dedicated to educating, empowering, and inspiring future thinkers, leaders, and innovators, UW's detachment from these local concerns necessitates a concerted effort to bridge this gap.

As an academic researcher, I had to seek out these issues actively. While online resources were abundant, it was the local community members, with whom I frequently discussed my research, who provided the most valuable insights. Engaging with individuals at the center of my research topics offered perspectives on technology equity that could advance knowledge

on the social benefits for Black communities. My scholarly privilege includes familiarity with topics surrounding Black users and technology, encompassing issues such as discriminatory and biased technological systems in areas like speech recognition AI, facial recognition, and automated decision-making.

Institutional research has highlighted the impact of unjust systems on Black people, yet Black community members are acutely aware of these issues. Academics often assume a position of all-knowing authority, believing that their knowledge is uniquely comprehensive. However, it is those with lived experiences who possess interpretive insights into phenomena impacting their communities. As scholars, we must seek to learn from and incorporate their knowledge into our work, recognizing the invaluable contributions of community members to our understanding of these complex issues.

**3) Establishing UW's goals and priorities in partnering**

When considering my next step in this process to establish a Black Community Advisory within UW HCDE, I found it necessary to check my privilege and powers as an agent of my university. What was intricately different in the conceptualization for a community advisory board as an accountable research mechanism, was that the stakes and implications of this program was to extend beyond my independent stewardship into HCDE as a university department and research community. The intent for the community advisory board wasn't to simply be an echo chamber to validate or consult my own research ideas, but to serve as a resource for the HCDE research community.

What I value the most about being a part of the UW HCDE research community is that we're a collective of people who share language which describes our common goals, vision, and principles. This is something that I noticed is distinct from many other academic divisions within the University of Washington College of Engineering. As an interdisciplinary engineering department, HCDE boasts a community of researchers who emerge from a diverse array of fields including computer science, sociology, public policy and communications.

This was a primary factor which motivated me to even pursue the Ph.D program. And as a member of this community I've found it so rewarding to be constantly reminded of the values which guides our work, scholarship, and impacts.

Across my research, service, and teachings in UW HCDE, I have constantly evaluate each instance against our respective mission, vision, principles, and goals. I truly believe that this has helped myself and other researchers in our organization to critically consider the choices we make and the impact we have on people, society, and the environment. I would argue that any public-interest research organization should have directives that guide their works collectively. In the HCD field, much research has suggested that researchers and designers ought to hold a person positionality and be reflective other their practices. What HCDE has fostered, is a collective sense of positionality which in-turn requires practitioners to align with. And while this in fact remains the choice of the individual, it signals to the world around us that our intentions are just and socially responsible.

In this step of developing the Black Community Advisory Board, I've found it necessary for institutional researchers like myself to know what your organization stands for and understand how might engaging community-collaborative partnerships be conducive to the identity and directives of the organization.

### 4) Outlining initiating organization's (UW HCDE) capacities and resources to support an external community advisory board

Once I was confident that HCDE had socially responsible goals and priorities that would conceptually support the establishment of a community advisory board, I was then faced with the practical aspects of stewarding such an initiative. By the start of winter quarter (January 2023), I was starting to strategically plan how this program could be manifest.

I was initially faced with the question of whether we had launched other community advisory efforts within the department or by individual researchers? My inclination was that there had not been such an effort to the scale and scope that I was envisioning, but I wanted

to due some due diligence and investigate. This involved speaking with our department chair and outreach manager to learn whether there had been similar effort ongoing or in the past. They were insightful in sharing that the only program that HCDE had launched was the External Advisory Board (EAB), which advises the HCDE Chair and assists HCDE faculty regarding program promotion, curriculum innovation, job placement, and department evaluation. The EAB is consists of industry, university, and community representatives who assist the Department in accomplishing its mission through strategic guidance. However, the EAB wasn't quite the type of CAB structure that I wanted to leverage. The EAB plays a distinct role in our department operations, but isn't inherently a community-based participatory mechanism for technology design research.

Once I was sure that there was an opportunity to actually develop a community advisory board within HCDE, I then considered how I might be be able to direct this program with support from others who are passionate about advancing Black users and people and technology design research. I decided that the HCDE Directed Research Group (DRG) structure would be a great place to start. Led by individual faculty members or doctoral students, DRGs are quarterly collectives of HCDE researchers who review relevant literature, pose research questions, and design and conduct user studies. In spring quarter 2023, I organized and recruited HCDE students to do hands-on work and research centered on *Elevating Black Corpus and UX in Speech and Language Systems* - a new research agenda to develop equitable, community-collaborative design methods to mitigate racial disparities and performance in automated speech recognition (ASR) technologies for African American Language (AAL). This working group was versatile in it's efforts to developing a B-CAB and conducting research on equitable ASR. I initially recruited 6-students to be research assistants and B-CAB program managers, whose involvement has fluctuated over the past year and a half. The inaugural B-CAB program team has been sustained through the 2023-2024 academic year.

Together, we strategically planned what roles and responsibilities would each person


Figure 5.2: HCDE B-CAB Program Team

have in supporting the B-CAB. I had a vision for how the program team would operate, but given the level of commitment in this effort, student assistants were asked to co-develop our structure for teamwork. In the steps proceeding this, the Program Team was involved as the amount of prep work needed in designing research plans and engaging CBOs was far too much for any one person. In working with each of these students assistants, I've grown in my ability to lead a research team through a number of research phases and projects. I've found this to be an amazing opportunity to mentor and also learn from students who are interested in human-centered research and deeply drawn to socially responsible research.

My intention to outline HCDE's capacities and resources was to understand the stakes and practicality of how we will be able to actually carry out the B-CAB. Outlining organizational capacity based on the people involved in this effort is distinctly important because it gave

me as a researcher the space to consider what my organization is able and willing to give, and what that might cost. This meant thinking tangibly about who would be involved in this effort from HCDE, why might HCDE researchers want to be involved, and what assets might they bring to shaping a meaningful project experience.

Another distinct aspect of capacity mapping is considering how might HCDE as an organization will financially support the B-CAB and what commitments to funding would we make. I knew from the inception of this program that I wanted this to be a participatory research experience that was not exploitative and non extractive in doing that, I found it to be very essential to consider how will we equitably compensate communities for their time. This didn't just mean funding for the individual community participants, but also the CBOs. And in doing so, I work with the program team and my advisors to propose a structure for compensation that was ethical and fair. The most necessary component was identifying a funding source for this. Fortunately, funds from the $60,000 Google Research Award was the perfect budget item given that I had proposed doing a participatory research project. Personally, I had aspirations to steward funds back into Seattle local Black communities. For far too long communities of Black people have been exploited in engagements with institutional organizations. And while compensation is only one aspect of equitable partnerships, its not everything. I worked with my advisors to outline a prospective budget for funding the B-CAB, which directly compensated $10,000 to the CBOs.

**5) Designing how the CAB would function**

As the initiating organization, it was imperative for the Human-Centered Design and Engineering (HCDE) department to meticulously design the initial plans for the Community Advisory Board (CAB) to function effectively as a collective body and research entity. As the program director and principal investigator, it was my responsibility to delineate our objectives for launching the Black Community Advisory Board (B-CAB). With the support of program student assistants, I endeavored to create a compelling identity for the CAB that

aligned with our department's guiding directives.

The initial task involved appropriately naming the CAB to reflect our goals. After multiple iterations with the Program Team, we decided on the "Black Community Research Council on Technology Equity, Accountability, and Interest," abbreviated as the "Black Community Advisory Board (B-CAB)." The B-CAB was conceived as an accountable mechanism for Community-Based Participatory Research (CBPR), designed to advance HCDE's commitment to equity and participatory collaboration in research. Furthermore, it aimed to create a pathway for Black community organizations to engage in dialogue and research on technology development.

Below is the initial description of the B-CAB:

Facilitated through HCDE at the University of Washington, B-CAB is a Seattle-based coalition of external non-profit community organizations and civic leaders who collaboratively explore the opportunities and challenges confronting the Black community within technology practices, advising on institutional design, data and research efforts. Collectively, the council will engage in dialogue, promote action, and envision solutions toward making technology more inclusive and equitable. By bringing together community-level knowledge with academic research, the council strives to foster a more just and equitable technology landscape that promotes growth and advancement for local Black people and communities.

**The proposed collective goals of the council are to:**

1. Center and elevate the voices of local Black community members and organizations in technology equity.

2. Recognize and understand issues and concerns of technology's impact on Black communities.

3. Serve as an accountability mechanism, providing actionable feedback and guidance on potential harms of academic research from the perspectives of Black people and

communities, suggesting measures to reduce unjust outcomes.

4. Promote technical competency and awareness among Black community members through civic technology stewardship.

**The participation and benefits structure is as follows:**

- HCDE will invite no more than 5 community organizations to the inaugural cohort of partners.
  - 1-2 organization representatives will directly engage as a member of the advisory board.
- HCDE and each accepted community organizations will co-draft a Memorandum of Understanding to define mutual benefits, goals, and responsibilities.
  - The CAB will run through the UW academic year (Sept. 2023 - June 2024).
  - The CAB members will meet once a month (/ 8 sessions) during their term.
  - Each sessions will run for 1.5-2hrs. The specific dates, times, and locations will be collectively determined based on the availability and capacity of the members.
  - Additional sessions may be introduced for collaborative research projects and workshops.
- HCDE will compensate community organizations and their representatives for their participation on the CAB.
- HCDE will lead in providing program support, resources, and staff. Partner organizations are welcome to contribute in ways that honor their mission, values, and capacities.

- Eligible Organizations and Representatives:
  - Organizations should be non-profits with advocacy missions that serve, empower, or represent local Black community residents.
  - Organizations should be based in the Greater Seattle/King County, WA area.
  - Organizations should have a history of at least 2-years of community engagement.
  - Organization representatives should be at least 18+ years of age.

The B-CAB offers Seattle Black CBOs a chance to be at the forefront of justice-oriented technology research. Organizations who become members of our CAB have the opportunity to:

- Empower the Community: Contribute to research that directly addresses the unique challenges faced by the Black community in the tech industry, fostering empowerment and inclusion.
- Drive Accountability: Advocate for greater accountability and transparency in technology research and innovation among research institutions and academic communities.
- Bridge the Gap: Foster meaningful partnerships between HCDE research group and the Black community, ensuring that research is relevant, community-engaged, and impactful.
- Inform Policy: Influence decision-makers by providing community-level insights that shape research, design, innovation, and policies promoting equity in technology.
- Promote Interest and Opportunities: Inspire interest in civic technology involvement and promote pathways for black people to access knowledge and opportunities within technology innovation.

Our north-star is envision and steward a technology landscape that upholds fairness, responsibility, and access for the Black community, creating a lasting impact for generations to follow.

### 6) Identifying local community organizations whose missions align with the advancement and advocacy of Black people

In this next step, I aimed to be thoughtful and intentional about identifying Seattle community-based organizations (CBOs) whose missions aligned with the advancement and advocacy of Black people. Seattle Black leaders know their communities best, and Black-led CBOs are deeply committed to working collectively for the greater good of the Black community. I sought to connect with organizations representing a range of sizes, neighborhoods, and community issues.

Throughout the spring 2023 quarter, the Program Team worked to map out potential organizations that could be part of the Black Community Advisory Board (B-CAB). In compiling a list of organizations, we prioritized analyzing their missions and visions to determine whether they might be a good fit. Our search methods included existing awareness, word-of-mouth, and internet searches. Ultimately, we identified 12 organizations that appeared to be strong potential partners for the B-CAB:

- Africatown Community Land Trust
- Urban League of Metropolitan Seattle - Young Professionals (ULMS-YP)
- Washington State Commission of African American Affairs
- Washington Department of Equity
- King County Equity Now (KCEN)

- WA State STEM
- B.U.I.L.D.
- African American Leadership Forum
- Tech Equity Coalition — ACLU of Washington (aclu-wa.org)
- Southeast Youth & Family Services
- National Pan-Hellenic Council – Seattle Chapter
- POCAAN / People of Color Against AIDS Network

These organizations have been advancing equity in Black communities long before institutional researchers became interested. Their deep local community agency fosters greater impact and a nuanced understanding of issues relevant to people in their neighborhood communities.

**7) Developing an outreach plan**

Knowing how to connect with organizations is pivotal for a successful outreach effort. An outreach plan can be as structured or unstructured as one would like, but it must be intentional. It was important for me to define outreach goals, strategies, and activities to produce a plan based on what I had learned about the various organizations. This meant connecting the B-CAB outreach goals with the ongoing community-based work being done by these organizations.

Using the description of the B-CAB program from Step 5, I led the Program Team in communicating and disseminating information about the B-CAB. My motivational outreach goal was to evangelize the purpose and potential impacts of the B-CAB and how it connected to the ongoing efforts of Black-led CBOs. The outreach efforts included:

- Connecting with local Black community leaders to share information about the B-CAB and create awareness.

- Developing a Community Partner Interest Application via Google Forms for CBOs to complete.

- Sending recruitment emails to community organizations, individual leaders, libraries, and centers to spread the word about this program.

- Publishing a Notion webpage to present information about the B-CAB and how to get involved.

- Planning and facilitating a B-CAB information session, where CBO leaders were invited to learn more about HCDE, my research, and details of the B-CAB. They were invited to apply thereafter.

  - Six Black-led CBO leaders attended the session and expressed further interest.
  - Twelve organizations were invited to apply as community partners.
  - Eight organizations actually applied to be community partners.

**8) Building trustworthy relationships with local community organizations**

Throughout my journey of fostering community partnerships, I've found it essential to build and cultivate trustworthy relationships with community organizations, genuinely and intentionally. Being a part of the local Seattle community has given me the opportunity to connect with Black-led organizations in unparalleled ways. In fact, there are several civic and social organizations that I have personally been involved in, engaged with causes such as social justice action, climate advocacy, policy advocacy, and education advancement.

As a design researcher, I've been naturally drawn to participatory research approaches because my infatuation with civic engagement inspires and engages me. My ongoing commitments and relationships with local community organizations have become invaluable assets for my research. It wasn't until those people who I am in community with began to express interest in my research that I became intentional about finding ways to engage them responsibly. Over the past three years, I have been deeply involved or connected with some of these organizations, but it has also been a challenge to gauge if or when I would be able to involve them in collaborative research efforts. I wasn't sure if my request would come off as extractive or if the CBOs would be interested. However, reflecting over the past year and a half, I realize that my success in gaining their trust has been attributed to the genuine ways in which I have cultivated relationships.

Here are a few key lessons I've learned:

- People trust people, not organizations blindly: CBO leaders want to work with me not because I'm an academic researcher, but because I exist in and build community with them.

- Honesty about academic roles is crucial: I have to be clear and honest about what I can realistically achieve in my academic role to set appropriate expectations.

- Trust must be earned by each person involved: When involving other university affiliates in building community relationships, they too need to earn trust. This includes student assistants working on the B-CAB effort. They have their own responsibility to serve communities in their capacity, whether by volunteering, joining an organization, or simply being present in shared spaces. This visibility forms the basis of trust for community building.

- Never assume people want to be part of your efforts: While I have had great success in gaining interest from CBOs for the B-CAB, not all of them desire to engage. This

could be due to reasons beyond my personal engagement, as sometimes projects are simply not the right fit. It all comes down to timing and priorities.

By understanding and applying these lessons, I have been able to foster genuine and trustworthy relationships with local community organizations, which has been fundamental to the success of the B-CAB initiative.

**9) Foundation Setting: Co-Defining Mutual Understandings of Partnerships**

In my journey to establish the Black Community Advisory Board (B-CAB), I realized the importance of building genuine and equitable partnerships with community-based organizations (CBOs). Here, I outline the steps I took to co-define mutual understandings with our community partners, guiding you through my process and emphasizing the significance of this collaborative approach. Allowing CBOs to co-define mutual understandings with university researchers proved to be incredibly significant. This approach differed from typical recruitment efforts in human-subjects research in several ways:

1. Building Trust and Clarity: CBOs appreciated knowing exactly what would be expected of them through our collaboration. The MOU provided a clear framework that fostered trust and transparency.

2. Respecting Community Needs: By giving CBOs a platform to express their needs, constraints, and priorities, we respected their autonomy and expertise. This mutual respect was foundational to our partnership.

3. Avoiding Extractive Practices: Traditional recruitment methods can sometimes feel extractive. By co-defining our partnership, we ensured that the relationship was mutually beneficial and respectful.

4. Ensuring Sustainability: Setting standards and expectations from the start helped create a sustainable relationship. This proactive approach reduced misunderstandings and conflicts.

5. Empowering Community Partners: Involving CBOs in drafting the MOU empowered them to have a say in the research process. This sense of ownership and investment was crucial for the success of our collaboration.

The first step was to understand the purpose of the Memorandum of Understanding (MOU). An MOU is a nonbinding agreement that outlines each party's intentions to form a new partnership. Setting clear standards and expectations at the beginning of our collaboration was crucial to establishing a sustainable and successful relationship. The MOU serves as a framework, defining the purpose of our collaboration, identifying the partners, and detailing the roles and responsibilities of each party.

With a draft MOU in hand, I shared it with the representatives of the CBOs we intended to collaborate with. The template included the following sections:

- Introduction: Purpose of work and identification of partners.

- HCDE, The UW, and Our Commitments: Values, mission, and vision of the university department.

- Involvement, Responsibilities & Timelines: Scope of work, timelines, structure, and stakeholder responsibilities.

- Partner Community Organization Asks and Gains: In being committed to supporting the missions, visions, and desires of CBOs, partners were asked to to surface desires from HCDE that honor and uplift the advocacy efforts of their organization *(e.g. we would like the UW to consider being a data-partner with our organization to collect,*

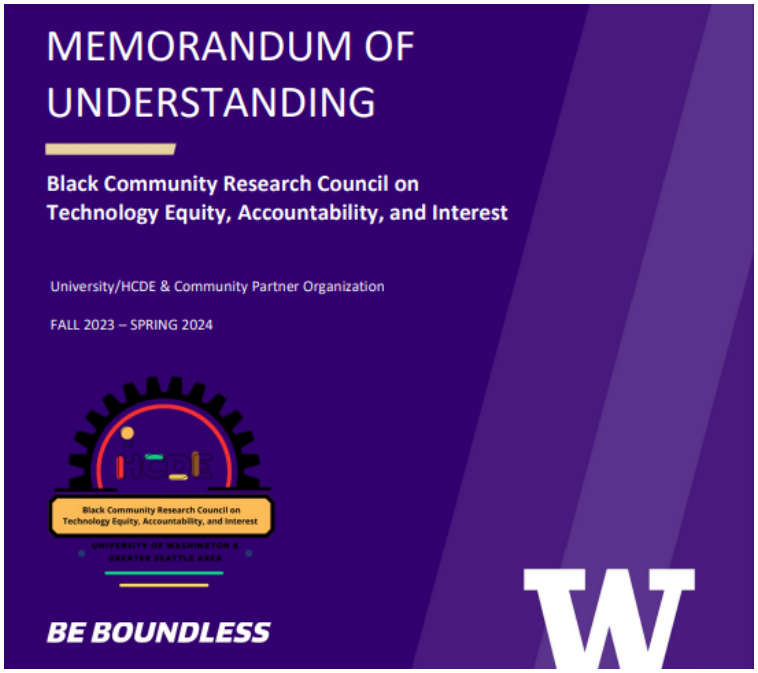


Figure 5.3: HCDE B-CAB MOU Cover Page

*analyze, and report of trends of impact of digital equity programs on Black people in Seattle/King County.*

- Compensation, Decisions, & Conflict Resolution: Details on compensation, decision-making processes, and conflict resolution procedures.
- Modification and Termination: Procedures for modifying or terminating the agreement.
- Acknowledgement: Spaces for signatures to formally acknowledge the agreement.

Next, I invited representatives from each CBO to schedule a virtual meeting to discuss the MOU in detail. I aimed to ensure that both parties had an opportunity to express their needs, constraints, and priorities. These meetings were crucial for addressing any concerns or questions the CBOs might have. During these discussions, we co-drafted the elements

of the MOU to reflect our mutual understandings and agreements. This step was essential for building trust and ensuring that our partnership was equitable and respectful. After our discussions, we finalized the MOU and sent it to the representatives for e-signatures. This formal acknowledgment helped establish a clear and agreed-upon framework for our partnership. It was gratifying to see the organizations appreciate having a structured agreement that clearly outlined their involvement and benefits.

**10) On-boarding and Orienting CBO Partners to the B-CAB**

The final step in establishing the Black Community Advisory Board (B-CAB) involved onboarding and orienting our community-based organization (CBO) partners. This crucial phase ensured that our partners were well-prepared and fully integrated into the B-CAB, fostering a robust foundation for our collaborative efforts during the 2023-2024 academic year. To demonstrate our commitment to supporting our community partners, we ensured that the CBOs provided the necessary payment details, including their address, EIN, and email. This step was vital for maintaining transparency and trust in our financial dealings. By accurately capturing all financial information, we reinforced our dedication to equitable partnerships. We then sent the required forms from the university's Human Subjects Division to the CBO representatives. These forms were necessary for formal participation and compensation, and their efficient completion helped smooth the onboarding process. This step was essential for meeting institutional requirements and safeguarding the integrity of our research collaboration.

Understanding the diverse schedules and commitments of our CBO representatives, we worked with them to capture their availability and meeting preferences for B-CAB monthly sessions and subsequent events. This consideration was crucial for accommodating their work-life constraints and ensuring their full participation. By being flexible and attentive to their needs, we aimed to create an inclusive and supportive environment for all members. Once all members were onboarded, we collaboratively established community norms to guide

our collaboration. This living document was referenced in each meeting to remind everyone of our agreed-upon ways of working together, fostering a sense of shared responsibility and mutual respect. Establishing these norms was a key step in creating a cohesive and respectful community, where every member felt valued and heard. As the Program Director, it was important to me to allow for democratic visioning. While the Program Team and I had initially defined these components, we intended them as signposts rather than definitive directives. After three rounds of brainstorming activities, we arrived at directives and an identity that we were all proud of. This process ensured that the mission, vision, and goals of the B-CAB reflected the collective aspirations and values of all partners involved.

Finally, we planned and facilitated an orientation and introduction event as our first meeting, scheduled for October 2020. This session was designed to help the B-CAB members and the Program Team get better acquainted and outline our work ahead. It provided an opportunity to build rapport and set the tone for our future collaboration. During this meeting, we discussed our goals, expectations, and the exciting possibilities of our partnership. The kickoff event was not only informative but also served as a bonding experience, laying the groundwork for a productive and collaborative year. Through these steps, I was able to build a strong, equitable partnership with our community organizations, laying the foundation for a successful Black Community Advisory Board. This narrative essay reflects my journey and can serve as a model for other researchers seeking to develop meaningful community collaborations. Beyond the scope of this dissertation, I intend to report findings on the future works of the CAB, while also extending my analysis to further understanding CABs as an accountable HCD method for technology design research.

## 5.5 A Researcher's Reflection

I start this reflection by sharing that this work to elevate underrepresented Black voices within HCI is on-going at present, and will be further analyzed post-dissertation. For rea-

sons of personal growth, ethical responsibility, and truly giving this work the capacity it needs to done appropriately, I cannot be involved in community projects that strictly coincide with tenure of a dissertation research project. The hope is that this work actually does some justice: to myself, the communities I center, and those who will engage with this work in the future. This chapter was originally intended to report on my analysis and findings of my final 'Establishing a Black Community Research Council on Technology Equity, Accountability, and Interest - University/Community Partnerships. I outlined the following research questions in relation to my dissertation:

- How might Black community-based advisory boards be responsibly established and implemented in university technology research and design organizations? What are the benefits and advantages to community-members and technologists?

In this introspective narrative essay, instead, I reflect on my account of why community advisories might facilitate the co-development of socially responsible research goals and outcomes in human-centered technology innovation. My intent is to give insight to how any qualitative, interpretive, and critically theoretical research exploration begins with oneself - the researcher, designer, and technologist. In doing so, I seek to share motivating and inspiring aspects of my lived experiences with this work, present a narrative of the steps I've taken, discuss my lessons thus far in co-developing a Black community advisory alongside community members, and set a vision for the continuation of this work and a future for community-based research approaches in design research of human-centered technologies.

During the course of my study within UW HCDE, I have worked to situate my research within the contexts of public interest technology, specifically engaging members of underrepresented and historically marginalized ethnic communities in my investigations. In particular, I find myself drawn to the experiences of Black/African American users within the artifacts that we as technologists and scholars have contributed. Many of my current and previous investigations have placed Black people as the demographic of users whose

technology interactions are studied. In doing work that collaboratively centers underrepresented and even historically marginalized people, I have found that participatory action within research and design as a method is time-consuming and requires a significant amount of investment from the research institution initiating the work. It's not enough to use universalist or pluralist user design methods and forms of participant recruitment to explore and address experiences of Black people in technology that lead to actionable and justice-oriented change. Commitments to safe and sustainable engagements are key to lasting relationships between researchers and Black communities, not simply one-off consultation or participation. In taking steps to further involve Black people in my work and those within my research community, I interrogated how Black individuals had engaged with the spectrum of participation, thus revealing opportunities to advanced inclusive research practices. It is my position that adopting community-collaborative HCD methods in human-computer interaction, computing, and design research affords situated empirical knowledge and practices for our research community to not only learn, but responsibly innovate , take action with Black users and communities affected by flawed technology.

### 5.5.1 Tensions of Black Individuals' Participation and Agency in Institutional Research

There exists much discourse relevant to the power imbalances that institutional research organizations yield when engaging vulnerable and historically marginalized communities. History has shown that institutional research organizations have been known to exploit and harm Black people for academic, medical, and scientific research. Insidious cases such as the U.S. Public Health Service (UPHS) Tuskegee Syphilis Experiment and the story of Henrietta Lacks at Johns Hopkins School of Medicine, has lead legacies to mistrust and skepticism among Black community members about participation in research studies. As a university researcher, I recognize the challenges that institutions have in fostering public

trust of research participation. And as a Black American man, I more deeply understand the reluctance some groups of Black people have when considering participation in institutional research efforts. Although there has been an drastic increase in standards for human-subjects research over the past 50 years to protect people's rights, privacy, and data in research, there remains challenges. The lack of accountability, imbalanced power dynamics, and opaque transparency that researchers can wield over people in research studies remains. This also extends to data science research that indirectly engages human-subjects through electronic data. And even with the emerges of institutional review boards (IRB) to oversee research ethics, these entities are primarily in place to protect the interest of the university, with an attention to the impacts on human-subjects only to the degree to which they present liabilities for the institution. So, in grappling with this, I question: *what mechanisms are in place to ensure oversight and accountability for technology design research from the interest and perspective of Black communities?* This is exceptionally appropriate to consider for research efforts on designing socially just human-centered technologies. Thus, leveraging existing relationships and partnerships that I have with local Black community organizations, I used this investigation to develop guidance and considerations for university researchers on establishing a community advisory board (CAB) toward fostering interest, accountability, and equity in technology research on Black people, users, and communities. In extending the contributions of my prior work and other scholars to develop equitable and participatory approaches [122; 116; 120; 251; 252], I decided to engage new and existing Seattle Black-community-based organizations as collaborative partners through the 'Black Community Research Council on Technology Equity, Accountability, and Interest' for the Department of Human Centered Design and Engineering at the University of Washington. The "Black Community Advisory Board" (B-CAB) has been essential in the sustained commitment of my research community to fostering equity and collaboration in our work, as well as creating a pathway for community organizations to voice perspectives on technology development.

### 5.5.2 Participatory Action Research is Labor Intensive for Everyone Involved

In my efforts to integrate collaborative participatory approaches into my research agendas, I have come to understand that leveraging them as methods in design research is complex. Participatory action research (PAR) is a labor- and resource-intensive endeavor. One of the primary challenges in participatory research is determining the stakes and accounting for the time required to effectively cultivate the approach with involved stakeholders. The Black Community Advisory Board (CAB) has provided a unique opportunity to pursue research longitudinally, given its 8-month participation term. Additionally, the CAB forms part of a multi-phase study that covers various technology topics and explores the feasibility of CABs in human-centered technology design research. This experience, along with other participatory research studies utilizing design workshops, has underscored the extensive time and effort required by all stakeholders to ensure that research practices are both effectively designed and thoughtfully executed.

For institutional researchers like myself, initiating PAR projects necessitates a careful consideration of one's capacity to carry out studies that prompt transformative civic action. While aspects of this are discussed in Step 4 -— Outlining the Initiating Organization's Capacities and Resources -— certain insights only become apparent during the course of the work. I have devoted countless hours to administrative and organizational tasks to shape every aspect of the CAB experiences for CBOs and individual participants. This includes sending emails, managing compensation logistics, designing research workshop materials and content (such as slide decks and supplementary reading materials), inviting guest speakers, and overseeing a team of student research assistants. This highlights the necessity of a CAB program team to collaboratively steward the operations and research efforts. Had I directed the CAB alone, I would not have had the capacity to conduct the work confidently. This labor-intensive work requires researchers to view themselves not only as extensions of their

organizations but also as members of society with a vested interest in social good. Grounding oneself in purpose and meaning is crucial to avoid misdirected efforts that could potentially harm the community stakeholders intended to benefit from PAR efforts.

Individual participants and CBOs are expected to engage in PAR with collaborative and democratic power. However, the burden that PAR can impose on communities is often underestimated. Many individuals who work for or represent CBOs are frequently constrained by time and capacity, especially within non-profit CBOs, where staff and volunteers may be limited. As a researcher, I have had to consider how to make participation as frictionless as possible for these participants. While they are eager to be part of the CAB, they also have core priorities and responsibilities related to their organizations' daily operations. Respecting their duties and making flexible accommodations has been essential in building allegiance with CBOs, as this demonstrates gratitude. Understanding what each participant and CBO values in their engagement is critical to maintaining interest and alignment. For instance, rather than presenting a predetermined research agenda for the CAB meetings, I asked participants to suggest technology-related topics that intersected with issues in the Seattle Black community. This approach led to community-guided research planning, allowing me to prepare a CAB research protocol based on topics of high interest and significance to the participants.

The B-CAB participants suggested the following topics, which we will be covering throughout the PAR project and agendas thereof:

- Racial Justice and Technology Equity
- Facial Recognition and Surveillance on Black Bodies
- African American Language and Automatic Speech (Voice) Recognition
- Data Equity and Stewardship in Black Communities

- Black Health and Well-being in Technology
- FinTech Innovation and Advancing Black Economic Mobility
- Generative AI and Black Culture
- Technology Design and Black Civic Engagement

Subsequent research reporting will extend on the findings of these individual research workshops. While the CAB is largely a part of the data collection in PAR, their participation in data analysis will be an additional asset. I will extend participation to CAB members to analyze, review, or even write on data to be reported in this experience. Thus, this expands my analysis to casual knowledge of participants and not that of only mine as the researcher. And aforementioned, considering the labor involved with engaging participants in this stage will be necessary for all stakeholders.

### 5.5.3 Policies and Guidance for Hyperlocal Community-engaged Research

Throughout the time I've spent building inclusive and equitable partnerships with CBOs to engage in participatory research, I've located most resources to guide practices of engagement through localized toolkits and resources. As a researcher, I've been accustomed to searching through research digital libraries and information sources in hopes of identifying scholarship which informs how to conduct participatory research. And while there are definitely literature available, there is something to be said regarding the lack resources available from these sources versus those found on websites from local organizations and municipalities. For the City of Seattle and surrounding communities of King County, WA, I am fortunate that municipal government agencies have provided guidance on inclusive engagement practices with minority community groups. The City of Seattle Office for Civil Rights published the

The Inclusive Outreach and Public Engagement Guide (2009)[1], as a resource to develop and implement outreach and public engagement processes inclusive of people of diverse races, cultures, gender identities, sexual orientations and socio-economic status. As part of the city's Race and Social Justice Initiative (RSJI), the Guide is intended to support their aim in working toward a vision where racial disparities will be eliminated and racial equity achieved. The Guide outlines several aspects that private and public actors should consider in building strong and sustainable relationships and partnerships with diverse population, including six essential strategies for inclusive engagement, and even metrics to evaluate public engagement processes. As I've shaped my engagement processes, I've leveraged this resource to inform hyperlocal knowledge that better represents and serve the community in which my work is situated. Similarly, the King County Office of Equity and Social Justice published the Community Engagement Guide (2011)[2] to promote effective engagement with all county residents and communities among agency employees and private entities.

Toolkits and guides provided by Seattle-based government agencies and community organizations are rich with information that guided the ways in which I went about engaging with CBOs to join the CAB and collaboratively conduct PAR. And when I found myself eager to collect other resources, I've found online toolkits supported by research to be useful in my pursuits. For example, the Community Tool Box (CTB) is an online service provided by the University of Kansas Center for Community Health and Development. CTB has rich resources that encourage and equip researcher to engage in community participation. I share these artifacts as a way to show that community engagement in research goes beyond what researchers may traditionally have access to in scholarship. For me, the HCI discipline commonly relies on the information sources such as the ACM Digital Library, but the field of computing research is limited on scholarship for community-based participatory action

[1]Seattle Inclusive Outreach and Public Engagement Guide (2009): https://tinyurl.com/seattle-IOPEG2009

[2]King County Community Engagement Guide (2011): https://tinyurl.com/kingcountywa-CEG2011

research, especially through community advisory boards. This work has pushed me to think outside of the confines of my institutional ivory towers, and to be more civic-minded in my works, which is something that researchers often must be reminded of. And while hyper-local toolkits and guides for community participation can be designed for specific cities or municipalities, these resources are not always widely available to others, especially if communities are resource or politically constrained. In such cases, researchers can use a number of online toolkits, guides, and playbooks centered on equitable community participation and collaboration:

- Tools and Resources for Project-Based Community Advisory Boards by Urban Institute
- Equity-Centered Community Design by Creative Reaction Lab
- Why Am I Always Being Researched? A guidebook for community organizations, researchers, and funders to help us get from insufficient understanding to more authentic truth by Chicago Beyond
- An Incomplete List of Resources for the Equity-Centered Designer by Isabelle Yisak
- Healing Centered Engagement Online Certification for Practitioners by Flourish Agenda
- A Designer's Critical Alphabet by Lesley Ann Noel
- Model Card Toolkit (MCT) by Google
- An Introduction to Co-Design Principles and Practice by Auckland Co-design Lab
- A guidebook to shift unequal power dynamics in participatory design practice by Hajira Qazi

## 5.6 In Closing: I Hope I've Done Some Justice

A pivotal learning point from my experiences of civic engagement, facilitating inclusive sustained dialogue and researching public interest technology, was evidence that leaders of communities who have been under-served by technology deeply desire to be a part of innovation efforts that will have positive impacts on members of their communities. What often is a seemingly limiting factor is the discontinuity in the ways in which communities as stakeholders external to technologists have been engaged in collaborative design research efforts. Whether it be research projects, technology design processes, or mechanisms for user experience feedback, computing technology research and development organizations have not had robust methods to involve disproportionately affected groups of users in decision and sense-making.

I have contributed research to the field of human-centered AI through my work at the University of Washington, in addition to industry collaborations at Microsoft Research, Google Research, and Apple AI/ML. Across these experiences, I've been able to draw areas of divergence with my own undertaking of utilizing these community-collaborative methods in my research, has been at the point of identifying what type of the entity (university, private tech firm, government agency) is initiating the collaborative partnerships, who are the people or stakeholders involved, and what might such a collaboration mean to local CBOs, especially those who represent and serve underrepresented ethnic/racial and socio-cultural minority groups? I have come to understanding that the stakes and applicability of industry and CBO collaborations could be different than partnerships initiated by academic universities and other non-profit research organizations. Simply put, companies and universities operate differently across varying axes of interest. Not only that, these entities represent different things not only to the people who work there, but also to those who are beneficiaries.

When reflecting on the defining elements of justice-oriented technological innovation practices—whether in research, interface/interaction design, or software development—the em-

phasis must be placed on human experience outcomes grounded in equity, inclusion, fairness, transparency, and accountability. These outcomes necessitate that technological user experiences and systems adhere to moral and ethical standards, respecting human values at their core. However, a fundamental value often stands in stark contradiction to the promises of technological innovation: the right to refusal, particularly the prerogative of communities to withhold their knowledge, labor, or cultural practices from being exploited for techno-capitalist purposes. Historically, universities and technology research and design organizations have frequently exploited vulnerable and marginalized groups, perpetuating a cycle of extraction and exploitation. When faced with this reality, it becomes understandable why certain communities may resist sharing sensitive cultural contexts for datafication purposes.

In my research on technology equity within Black American communities, I have encountered significant discourse, particularly during recruitment and study conduction, about the potential stakes and implications of cultural data use in artificial intelligence (AI) systems. For instance, while researchers strive to achieve linguistic inclusion of African American Language (AAL) in natural language processing (NLP) technologies, some African Americans express concern that such inclusion might result in severe unintended consequences, such as surveillance, discrimination, harassment, or even appropriation—whether by AI systems themselves or by individuals who misuse these systems. Pertinent questions arise: Does the identification of the race or ethnicity of an AAL speaker pose a risk to that individual? Could dialect-specific automatic speech recognition (ASR) systems be deployed to monitor the conversations of African American citizens suspected of criminal activity? Might hiring algorithms identify and penalize applicants associated with AAL or historically Black organizations, such as Howard University (an HBCU), the National Association for the Advancement of Colored People (NAACP), or the National Society of Black Engineers (NSBE)? Additionally, could AI misinterpret colloquial terms and phrases from AAL as "aggressive, threatening, or negative" in emotion-sentiment analysis? These critical questions challenge the very promises of inclusivity that AI purports to uphold, thereby compelling technology

stewards to deliberate carefully on whether specific systems should be culturally adaptive.

This approach necessitates a departure from the techno-savior mentality, which seeks to address all problems through technical mediation, and a shift towards community-led innovation that prioritizes the desires and needs of the affected populations. This approach includes acknowledging and respecting communities' decisions to refuse datafication when they perceive that technological artifacts might harm or further marginalize them. Despite the persistent power imbalances between those who design AI technologies and those who are subject to them, adopting deeply community-engaged approaches, such as establishing a Community Advisory Board (CAB), offers a promising pathway toward more humane technological practices. These practices not only focus on the user but also encompass the broader human experience, fostering innovation that is genuinely equitable and just.

# Chapter 6

# Discussion and Conclusion: Toward a Techno-Realist Innovation Framework

The studies presented in the previous chapters of this dissertation have explored many facets of the experiences of Black American users of interactive AI systems, the structural biases that limit the full enfranchisement of Black Americans in technological innovation, and the design methods that affect those experiences and those biases. In this final chapter, I take a historically-informed and future-oriented approach to synthesizing my findings, re-engaging with the core research questions for the dissertation, culminating with the presentation of a novel Techno-Realist Innovation Framework for human-centered technology research and design. This framework is intended to serve as a set of practical and actionable guidelines for technology designers , shifting the design discourse away from a mode of universalist problem-solving and toward one of socially-oriented realism.

## 6.1 A Techno-Realist Innovation Framework for Human-Centered Technology Research and Design

The Cunningham Techno-Realist Innovation Framework

1. Normative Guidance: Identify morally permissible technological disruptions and necessary remediations for unjust innovations.

2. Assuming Responsibility: Determine who is responsible for addressing injustices caused by technological innovations.

3. Recognizing Social Structures: Consider how technology influences divisions of labor and distributions of goods and harms across society.

4. Localized Community Collaboration: Leverage the cultural assets and capacities of marginalized communities for inclusive design.

5. Addressing Ontological Harms: Recognize and address deeper impacts on identity and lived experiences.

6. Operationalizing Accountability: Include marginalized communities in the innovation process for broader accountability and co-design of innovations.

7. Implications for Policy and Practice: Extend beyond design into institutional policies and government regulations to guide practices that ensure technology promotes social equity and holds stakeholders accountable.

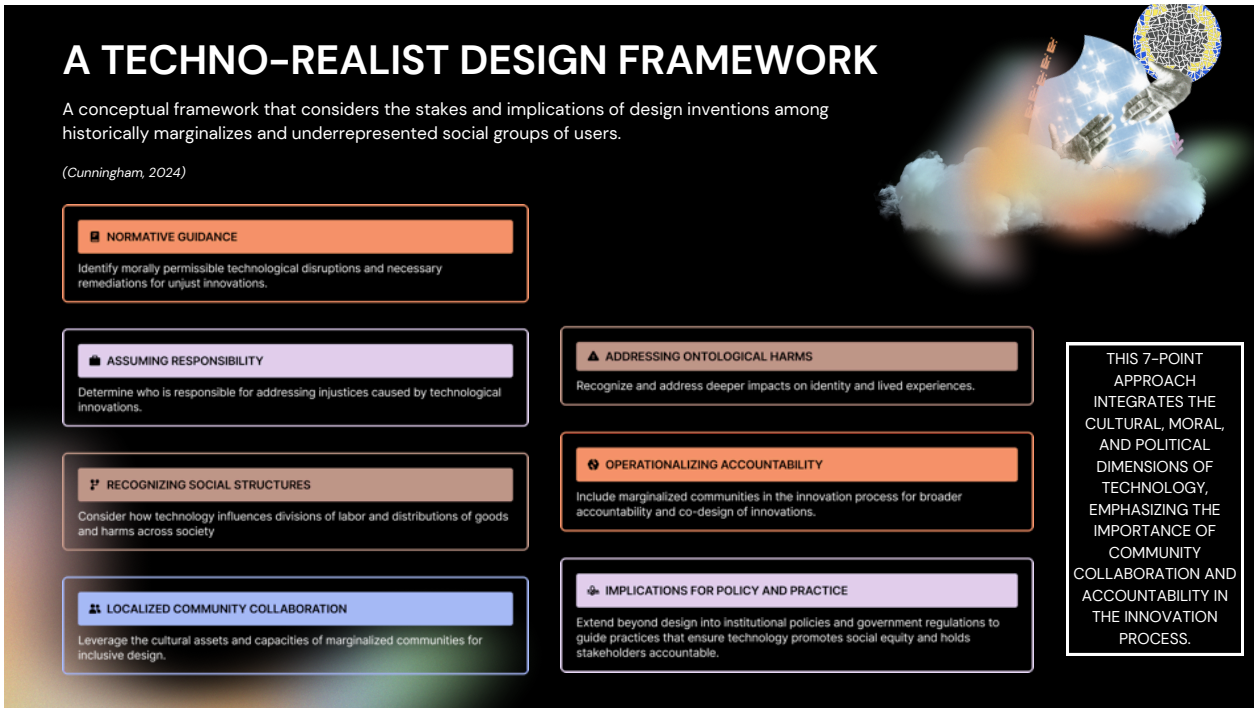


Figure 6.1: Techno-realist Design Framework

**Normative Guidance** - Identifying Morally Permissible Technological Disruptions and Necessary Remediation for Unjust Innovations. Technological innovations should be assessed for their moral and ethical implications before and after deployment. The framework provides normative guidance to evaluate which disruptions are morally permissible and which require remediation due to their unjust nature. This includes:

- Moral Evaluation: Establishing criteria for evaluating the ethical implications of technological innovations. Innovations should enhance freedom and equality, avoiding harm to marginalized communities.

- Continuous Assessment: Implementing mechanisms for ongoing assessment of technological impacts, allowing for timely interventions to address any emerging injustices.

- Practical Step: Developing an ethical review board within organizations that includes community representatives to assess and provide feedback on technological innovations.

For example, The deployment of NLP systems like automated speech recognition should be continuously evaluated to ensure it does not perpetuate linguistic biases against African American English (AAE) speakers, and remediation should be applied when biases are identified [253]. As exhibited in Chapter 4, NLP practitioners could advance fairness in ASR by involving Black American AAL speakers in the design and evaluation processes. Perhaps through organizing a linguistic inclusion review committee review and evaluate NLP system performance for AAL recognition and cultural dissonance. As I've discussed in Chapter 5, the review committee could be comprised of Black CBOs, AAL speakers, or even sociolinguists to thoughtfully guide the innovation efforts in harm-reducing manners.

**Assuming Responsibility** - Determining Who is Responsible for Addressing Injustices Caused by Technological Innovations. Accountability must be clearly defined to ensure that

all stakeholders understand their roles and responsibilities in mitigating injustices caused by technological innovations. This involves:

- Clear Responsibility Mapping: Identifying and mapping the responsibilities of all stakeholders, including developers, policymakers, corporate leaders, and community members.

- Transparency: Ensuring that all processes related to technological development and deployment are transparent to allow for public scrutiny and accountability.

- Practical Steps: Creating accountability frameworks that define the roles and responsibilities of each stakeholder, and establish mechanisms for reporting and addressing grievances.

For example, in the context of AI systems used in digital banking discussed in Chapter 3, American financial institutions and app-based services must be held accountable for ensuring their systems do not discriminate against financially insecure and historically marginalized groups of people. This could mean that fintech products developed by a leading U.S. bank should be accompanied with social fairness evaluations metrics to guide designers through a which reviews stakes and implications for disproportionately affected users. Designers of AI system for lending should aware of how historical lending practices have harmed African Americans living in predominately Black zip-codes. Thus, excluding proxies for race and socioeconomic level, may yield fair lending practices and transparent decision-making processes to users or applicants. And if systems begin to perform unfairly, the designers immediately take responsibility by taking action to mediate the harmful events, while updating their own evaluations to account for this in the future.

**Recognizing Social Structures** - Considering How Technology Influences Divisions of Labor and Distributions of Goods and Harms Across Society Technological innovations im-

pact social structures, influencing how labor is divided and how goods and harms are distributed. The involves:

- Structural Analysis: Analyzing the broader social structures influenced by technology to understand their impact on different communities.

- Equitable Design: Designing technologies that promote equitable distributions of goods and minimize harms, especially to marginalized communities.

- Practical Steps: Conducting social impact assessments as part of the design process to identify potential inequalities and developing strategies to mitigate them

For example, AI facial recognition technologies to monitor municipal crimes in Detroit, MI must be designed and implemented in ways that do not disproportionately harm African American communities who have been over-policed systemically. This could mean attempting to understand whether surveillance technology actually make Detroit residents feel safer or more at risk for law enforcement violence. While the city government may be the user or client for the AI technology, the citizens are actually impacted by the decisions that law enforcement will make with the technology. Thus, a joint effort to conduct an impact assessment among Detroit citizens (especially those marginalized and vulnerable), social justice community-based organizations (CBOs), the City of Detroit Administration and Police, researchers at the University of Michigan, and technical sales at the tech firm developing the AI, are all needed before the deployment of facial recognition technology. This could validate whether residents and the city actually benefits from this technology, and if so, ensuring fair use of facial recognition surveillance and equitable treatment among citizens through recurring evaluations. And if the implication of such AI technology are too grave, then opting for pathways of refusal would be the most humane reaction.

**Localized Community Collaboration** - Leveraging Cultural Assets and Capacities of Diverse Communities for Inclusive Design. Integrating community knowledge and collaboration is essential to ensure that technological solutions are inclusive and culturally sensitive. This involves:

- Participatory Design: Engaging marginalized communities as active contributors to the design process rather than passive recipients of technology.
- Cultural Competence: Understanding and leveraging the cultural assets and capacities of these communities to inform design practices.
- Practical Steps: Establishing Community Advisory Boards (CABs)[1] and facilitating regular community design workshops and sustained engagement opportunities among the community members and designers.

For example, a community advisory board (CAB) that includes Seattle Black community members could be partners in a mixed-reality (XR) design hackathon to preserve history of the Central District Area. The CAB members could indicate that youth and elders are target groups of participants to partner with XR designers in translating cultural histories, figures, and narratives to guide the development of XR technologies. This multi-stakeholder approaches immerses everyone in the community-in-focus, and aims to ensure that XR technologies genuinely reflect and serve their interests.

**Addressing Ontological Harms** - Recognizing and Addressing Deeper Impacts on Identity and Lived Experiences. Ontological harms affect the very being and identity of individuals and communities. This involves:

- Historical Context: Acknowledging and addressing the historical and systemic biases embedded in technological systems.

[1]See Chapter 3 for Black Community Advisory Board Case

- Community Engagement: Actively involving communities in identifying and addressing these biases.

- Design for Justice: Creating technologies that not only avoid harm but actively contribute to social justice.

- Practical Steps: Implementing community resilience workshops that focus on understanding and addressing ontological harms, and developing educational programs to raise awareness among technologists.

The Sustained Dialogue process, for instance, could be effectively facilitated among designers and marginalized community members through recurring workshops. These workshops might adopt the Equity-Centered Community Design (ECCD) framework [254], which integrates the roles of individuals, systems, and power in the development of solutions or approaches that impact diverse communities. A distinctive feature of this framework is its emphasis on cultivating humility to recognize personal assumptions and biases, as well as fostering empathy to observe and listen without judgment. Furthermore, ECCD bridges the gap from historical context to healing by encouraging participants to unlearn misinformation and reclaim cultural and historical aspects that are integral to their identities. In the development of a healthcare risk assessment AI, for example, ECCD could be employed in community resilience workshops involving vulnerable patient groups, healthcare providers, and hospital administrators. This approach intersects community development, design-based problem-solving, and the pursuit of equitable outcomes, thereby creating a fertile environment for ideating culturally innovative approaches and iterative prototype solutions that aim to reduce further marginalization of already vulnerable populations within the healthcare system.

**Operationalizing Accountability** - Including Underrepresented Communities in the Innovation Process for Broader Accountability and Co-Design of Innovations. This involves:

- Inclusive Processes: Integrating underrepresented communities into every stage of the innovation process, from ideation to deployment.

- Shared Equity: Ensuring that community members have a sense of equity and responsibility for the technologies developed.

- Practical Steps: Endowing collaboration or fellowship opportunities specifically for underrepresented community members as cultural innovators, where they work with designers to contribute socially beneficial technologies.

For example, partnering with community innovator hubs like the William Grose Center for Cultural Innovation through supporting resident cultural innovation fellows. The fellows could manage technology design programs that center the community's voices in commercial and speculative technology development. Additionally, the fellows, innovation hub, and any community participants would be compensated generously for their time. Cases could even extend to shared patents and claims to contributions among innovator hubs and institutional entities.

**Implications for Policy and Practice** - Extending Beyond Design into Institutional Policies and Government Regulations to Guide Practices that Ensure Technology Promotes Sustained Social Equity and Holds Stakeholders Accountable. Which extends to institutional policies and government regulations, emphasizing:

- Regulatory Frameworks: Developing legal and regulatory frameworks that mandate inclusive design practices and protect marginalized communities.

- Policy Advocacy: Advocating for policies that promote social equity and hold all stakeholders accountable.

- Practical Steps: Working with policymakers to draft regulations that enforce ethical design principles and creating advocacy groups to promote these policies.

- Practical Application: Implementing policies that require continuous evaluation and adjustment of technological systems to ensure they remain just and equitable.

For example, The FDIC can create policies in collaborations with communities that require financial institutions to regularly audit their AI-driven decision-making processes and technologies to ensure they do not discriminate against African American users.

### 6.1.1 Concluding this Framework

The Techno-Realist Innovation Framework presents a comprehensive approach to developing technological solutions that are socially responsible, equitable, and accountable. By balancing optimism with skepticism, redefining user experiences, and deeply engaging marginalized communities, this framework promotes a landscape of technology innovation that responsibly serves the common good of humanity. It pushes technology designers beyond problem-solving, urging them to consider the broader social and political implications of their work.

Traditional approaches to technological innovation often neglect the deeper, structural issues of social justice, particularly regarding anti-Black racism and discriminatory design. The problem-solution binary central to much of HCI overlooks the ontological harms faced by marginalized communities, failing to address the broader social contexts in which technology operates. Moving towards a just and equitable technological future requires a fundamental shift in our approach to design and innovation.

The Techno-Realist Innovation Framework offers this shift by integrating normative guidance, accountability, analysis of social structures, community collaboration, and recognition of ontological harms. It ensures technological advancements promote freedom, equality, and justice. This framework advocates for continuous improvement, interdisciplinary collaboration, and policy advocacy to ensure technology benefits all society members, especially those

historically marginalized. The Framework is crucial for fostering a future where technology uplifts and empowers everyone. It calls on technology designers and policymakers to engage in practices that contribute positively to social equity and justice. By embracing this framework, we can ensure technology serves as a force for good, enhancing human agency and dismantling systemic inequities.

## 6.2 The Culture of Technology Innovation

Prior research[2] has informed the works of HCI scholars that have explored the dangers of developing technology in response to any and every potential human problem [255],[256], [257]. A recurrent theme of this literature is the absurdity of solving complex structural issues like anti-Black racism with individual devices [258; 259]. Scholars like Safiya Noble [260] and Ruha Benjamin [261; 262] characterize a technology design space perpetuating harms to historically marginalized populations by proposing over-reaching, under-performing, and paradoxically problem-making solutions. With terms like solutionism [263], techno-fix(ation) [72] and technochauvinism [264], they emphasize the importance of paying attention to the wider racializing effects of technology solutions, even in our own community [265]. Ogbonnaya-Ogburu and colleagues [265] identify the "interest convergence," where racial inclusion efforts in HCI risk perpetuating forms of racism through the veneer of altruism and "innovation." According to Oleary [126], "conventional design practices" themselves "may perpetuate forms of institutional racism," enabling and legitimizing racialized forms of inequity. Looking to the racializing effects of technology development more broadly, critical race and technology scholars have explored a range of issues, including the following: digital devices that fail to meet the needs of Black and Brown users [19]; Blackness as a key site through which

[2]This text complements and extends ideas of my previous published work[13]. Contributing Authors: Cunningham, Jay, Gabrielle Benabdallah, Daniela Rosner, and Alex Taylor. "On the grounds of solutionism: Ontologies of blackness and HCI." ACM Transactions on Computer-Human Interaction 30, no. 2 (2023): 1-17.

surveillance is practiced, narrated, and resisted [266]; and computing firms' development of technology that disproportionately disadvantages Black Americans [267]. Complementing this range of work, scholars have brought an intersectional lens to questions of equity [268; 269; 270], citing design as a resource for alternative forms of world-building [271; 272]. Yet despite this rich body of critical analysis, the HCI field continues to struggle with inclusive approaches that effectively address the pervasive and lasting inequitable consequences of racism. Much uncertainty remains around the problem-solution binary [259] and the forms of techno-solutionism rooted in systematic and institutional racism [273].

## 6.3 Human-Centered Computing and Problem Solving

The field of human-centered computing and interaction design addresses how information and computing technologies are innovated to impact people's lives. Innovation in this context encompasses the conceptualization, research, design, building, and dissemination of technical artifacts. Initially, I struggled with the notion of innovation, believing it had to be something completely new or novel, unseen by mankind. However, innovation is fundamentally about advancing human agency—whether through knowledge, reasoning, mobility, communication, health, liberty, or freedom.

When conceptualizing what makes technology innovative, it is essential to recognize that technology is not binary. It is a tool that propels human agency through automation, calculation, or decision-making. Technology is more than machines performing tasks; it is an extension of ourselves and our environments. Kranzberg [274] theorized that *"technology, in a sense, is nothing more than the area of interaction between ourselves, as individuals, and our environment, whether material, or spiritual, natural, or manmade."* The existence of the field of HCI/HCDE suggests that technical artifacts have transcended humanity, prompting us to reorient our focus towards advancing mankind and our environments.

To date, HCI scholars have mapped specific forms of problem-solving (e.g. [275; 276; 277];

critiqued the problem-solution binary [278; 279]; and examined the movement of problems across contexts [126]. On the one hand, this work identifies the paradox of solving structural problems such as wealth gaps with apps focused on individual behavior change [280]. On the other hand, scholars note the propensity for developing solutions to problems that don't exist [281].

## 6.4 Ontologies of Blackness and Human-Centered Technologies

In my dissertation, I interrogate how technology designers research and produce artifacts that impact African American users of interactive AI systems. Central to my inquiry is the question: How can technological innovations be developed to fairly and positively advance the lives of African American individuals through interactive AI systems? My research aims to equip responsible designers with the confidence and integrity to innovate a just and socially beneficial technological future. This perspective is informed by my personal and professional experiences as a Black man, civic engagement organizer, and computing technologist.

The Human-Computer Interaction (HCI) field faces a conundrum: addressing social justice issues of anti-Black racism often involves relying on the same logics and structures that perpetuate harm and violence toward Black lives, leading to a dead-end. For HCI and design, this scenario invites a rethinking of efforts to seek equity and justice more broadly. We must ask whether the problem-solution paradigm is part of an ontological framework that inherently reproduces the inequities and harms HCI seeks to counteract [282]. Drawing on Calvin Warren [283] and other scholars in Black studies, I argue that a response to this dead-end could pave a fragile but hopeful path for HCI and design. I envision a design approach that resists the problem-solution pairing and contemplates the possibility of solutions without predefined problems, thus creating conditions for alternative forms of existence.

In HCI and socio-technical design literature, ontology refers to various phenomena, from formal representations of categories [284] to understandings of existence [9; 285]. Warren's ontology engages with questions about the nature of being, rooted in Western philosophy, but he critiques this ontology by introducing the concept of "ontological terror"—the particular horror induced by the "metaphysical nothing" of being Black in an anti-Black world. This perspective highlights how HCI's approach to problem-solving in technological innovation has specific consequences for technological relationships to life and liberation [286; 266]. By drawing on the work of Warren, André Brock, Edna Bonhomme, Simone Browne, and related scholars [261; 260; 266; 286], I propose expanding critical design scholarship to address the pitfalls inherent in technological solutions [287; 251].

This theoretical framing underscores the importance of critically examining Blackness in traditional HCI problem-solving approaches. For those who do not experience anti-Black racism, this framework offers an invitation not only to allyship but to sponsorship through social justice-oriented research and design. My aim is to inform HCI theory and practice with vital historical and philosophical contributions that are often overlooked in HCI scholarship.

In Meaning in Technology [288], Arnold Pacey explores how an individual's sense of purpose and meaning affects the shape and use of technology. He examines the contexts in which technology is used, relating it to nature and society, and discusses themes such as environmental concerns, gender, and creativity. Pacey concludes with the possibilities of a more people-centered technology, advocating for a participatory and ethical approach that values people and their environment.

Pacey's earlier work, The Culture of Technology [289], addresses societal and cultural issues that remain relevant today. He argues that technology is expressive of cultural values and has significant political, cultural, and moral implications. Technology should not be viewed as a value-free sphere but as a practice that applies technological knowledge to effect positive changes. Pacey urges a broader understanding of the impacts of science and technology on society, advocating for educational approaches that engage both users and

professionals in dialogue [289]. He posits that if dialogue and interaction are encouraged, future innovation will become relevant to societal needs rather than merely fulfilling experts' technical ideals. Pacey sees engineering and technology practice as forms of art and expression, emphasizing the existential joy at the heart of engineering. This perspective shifts the focus of technology innovation from capitalist allure to human agency, advancement, and joy.

A long line of HCI and design scholars, including Winograd and Flores, Anne-Marie Willis, Tony Fry, Cameron Tonkinwise, and most recently Arturo Escobar, have argued for an ontological approach to design [285; 290; 291; 9]. Ontological design describes how the designed world also shapes the designer [292; 293]. Winograd et al. [9] argue that the most important designing is ontological, as it constitutes an intervention in the background of our heritage, deeply affecting our ways of being in the world. Thus, design, through its capacity to shape both inner and outer conditions of existence, is inherently ontological.

However, ontological design presumes a particular orientation, as any experience of the world presupposes a specific stance. Historically, ontology has superseded experience in favor of an abstract theory of being, tied to the origins of racial Western social theory and their epistemological positionality (see Robinson on Marx's "universalism") [294]. While some might understand their being as shaped by design, Warren might ask what happens to those whose being functions in an anti-Black world without being [283]. What happens to those whose being is not the target of the solution but the site of the problem?

## 6.5 Shifting Focus: Joy, Liberation, and Justice in Technological Innovation

Joy manifests through liberatory and justice-oriented experiences, both socially and technologically engineered, where all of humanity participates as designers. My thesis on justice-

oriented technology design draws on Donna Haraway's concept that "positioning implies responsibility for our enabling practices," [7] supported by social justice research in human-computer interaction (HCI). Researchers such as Fox [14] and Dombrowski [12] advocate for an ontological position in HCI that questions not only what is technologically innovative but also how to design ethically, responsibly, and with accountability.

Broussard [264] introduces the concept of techno-chauvinism, illuminating a form of technological hyperbole that roots "the belief that tech is always the solution" in patriarchal STEM disciplines. For Broussard and other critical technology scholars, the widespread application of computational design to various problems reflects patriarchal norms [258; 295; 17]. This approach is not novel. During World War II, the influential American mathematician Norbert Wiener cast egalitarianism as forged through the application of computational design to societal challenges, as Fred Turner explains [296]. Contemporary techno-solutionist trends emerge from and reproduce these techno-optimist roots of computing [297].

In response to these critiques, a strand of HCI scholarship suggests that designers should propose alternative possibilities [295; 259]. Instead of offering superficial solutions to problems, designers should analyze the potential outcomes of their interventions [278]. Urban planning scholars Horst Rittel and Melvin Webber adopt this approach in their landmark 1973 article *Dilemmas in a General Theory of Planning* [298], where they introduce the notion of "wicked problems." Characterizing urban planning as one of the most optimistic disciplines, they highlight the tendency to prefer "tame" (solvable) over "wicked" (unsolvable or lacking an optimal solution) problems. Unlike mathematical equations or chess games, wicked problems such as poverty, education, or mobility produce social and political complications without fixed answers, formulations, conclusions, contingencies, or values. The authors emphasize that such problems are "[n]ot 'solved.' [...] At best they are only resolved—over and over again" [298, p. 160]. Writing amidst the 1970s "science wars," where social scientists advocated for a shift from generalizable, efficiency-based frameworks to value-based alternatives, this insight anticipated various initiatives within design, engineering, and

computer science fields, such as critical-technical practice, value-sensitive design, participatory design, and algorithmic fairness—all calling for broader forms of accountability. Rittel et al. [298] argue that planners (designers) are liable for the consequences of their actions, framing social (or structural) problems as socially and politically contingent.

## 6.6 Get Real: Toward Techno-Realism in Technology Research and Design Innovation

A Techno-Realist framing toward designing justice-oriented technological innovations considers the stakes and implications of design inventions among historically marginalizes and underrepresented social groups of users. This approach integrates the cultural, moral, and political dimensions of technology, emphasizing the importance of community collaboration and accountability in the innovation process. It entails taking a position that sees the structures that put Black and Brown people at risk within and outside the advent of technological artifacts. This, Benjamin describes, is the "duplicity of technological fixes—purported solutions that nevertheless sediment existing hierarchies" [262, p. 3].

Seen through these traces and sediments, we in HCI research are left with a vivid sense that developing a solution is always working from, and within the limits of, a particular position. We see that these issues, as Browne [266] so sensitively and adeptly shows, run through histories of racialized surveillance in which bodies are treated arbitrarily. To take a position on a problem, from the endpoint of a solution, means situating oneself within a framework of meanings, values, and beings. In cases of designing financial and banking technologies, as examined in Chapter 3, this entails formulating innovations from a position implicated in the lives and livelihoods of historically marginalized communities of Black Americans in the context of finance and economics. Those of us who decide what technological capacities and possibilities to build are also deciding what histories of discrimination, exploitation, and

violence we choose to see, and which we elide or erase. But, at the same time, to work on a innovative solution to a problem means taking a position that is too often located outside of the frame of the problem-solution.

Although we in HCI research strive to be accountable for the systems we design and build, the appeal of techno-solutions persists. This fixation on technological solutions reveals a failure to fully comprehend the broader contexts within which we operate. We acknowledge that the innovations we develop are often insufficient and sometimes risk causing more harm than good. However, we are uncertain how else to approach design or reposition ourselves. This may represent a crisis in the development of techno-solutions, suggesting that a faulty frame does not preclude the possibility of a solution but opens a path for interrogating positions and a technological innovation framework that realistically addresses the surrounding social structures and implications.

The stakes we decide upon are complicated by our positions of privilege. With a problem-solving mindset, our focus becomes the goal, often leading us to overlook how we are implicated in broader networks of racializing relations that perpetuate the injustices and harms we seek to alleviate. Many of us fail to account for our position within a wider political context and overarching mode of existence, whether unintentionally or deliberately. Consequently, we may arrive at a point where designers' limited experiences and positioning—highlighted by the fact that Black designers constitute only 3% of the industry [299]—are central to broader societal problems. From Warren, we should learn to engage the unruly connections between solutions and the ontologically-denied existence of Blackness, prompting a reevaluation of our path thus far. We have observed that solutions inherently come with problems and that, in developing solutions, designers engage a wider set of stakes and positions that simultaneously shape and respond to the governing structures in which they live. Warren's proposal invites us to inspect solutions from both inside and outside existing frameworks of being.

Scholars within and outside HCI [273; 300; 301] have begun to show that solutions engage

frameworks that presume a lot: that designers have the means at their disposal to change the conditions that prolong racial inequities, that designers might work towards solutions that "translate into freedom, justice, recognition, or resolution." The hope here is one of resolving the problem. A reimagined solution might mean taking two concrete steps [13]:

1. *Splitting the problem from the solution.* This is to break the problem-solution pairing that solutionism has depended upon. (We have seen this implicit in the parody of willful acts of undesign, nondesign, etc., e.g. [302; 303; 304; 305])

2. *Examining the problem without a solution.* This is to see the problem free from the shadow of the solution. (Something Rittel and Webber tried but fell short of achieving).

To follow these steps is to insist on our willingness to hold accounts that chafe or wear down the present moment. Likewise, it means to trust that we in HCI and design are able to take responsibility for stakes we decide upon and the positions we take in such a present. But, from Warren, we learn that, even if it all goes well, it will likely give us only temporary reprieve. The frameworks we so unevenly operate within, and the instruments we enlist to set the possibility of change in motion, will be the same ones that underlay the injustices—— the "vicious and tortuous cycle" Warren decries. To decouple the solution from the problem and then to free oneself from it (from the solution) leaves the framework of being intact. It is to remain within the precincts.

The option left to us——seeking an outside to frameworks of being——is the radical one:

3. *Examining the solution without the problem.* This is a refusal to see a solution with a problem or treat a solution as if problems must exist.

With hesitance—acknowledging the relentless questions that Warren uses to push us to keep probing—we want to pose this option as a question: "what if operating outside a framework of being, an ontology, could mean working towards a solution without its problem?"

The imaginary this question opens up is one in which solutions are not just *outside* possibility but *without* possibility. Sought after, here, is a fragile opening, one that could offer the conditions for refusing existences that set the conditions for possibility.

This undoing—the solution devoid of problems that might not exist, cannot exist, or must not exist—exposes the limits and assumptions of control over the worlds that HCI and design help cultivate and shape. It seeks to situate research and design in a process that resists ideas such as *anything we do will continue to exist or anything we have made can be altered* [306, p. 24, p. 172]. Without the security of the problem and within the destabilizing (possibly terrifying) precincts of ontology, it presents a basis not for processes of fixing but of collectively making do, again, and again, and again.

Within HCI, critical frameworks of Afro-futurism, speculative design, and Black feminism have generatively framed design practices beyond the problem-solution pair—outlining forms of creativity, imagination, and expression that collectively envision the world differently from how it is today [307; 308; 309; 271; 3]. Putting these ideas into practice, approaches like Participatory Action Research (PAR) and Community-based Participatory Research (CBPR) make room for shifting the locus of power within decision-making and problem-framing from those outside the stakes (designers) to those inside (community) [310; 311; 312]. In this work, scholars have critically engaged concepts such as "giving voice," "empowering," "empathy-building" and "placing participants in the driver's seat," showing how they still sometimes operate within a problem-solution pairing that separates research from action and allows designers to hold fast to interpretive power [313; 314; 315; 316; 317]. What I extend from Afro-pessimistic ontology [283] is not a retooling of existing HCI approaches, but a possible philosophical extension to galvanize. It is to see design——and a legacy of inequity that correlates with its practice——as always developing within a hermeneutic world it must also revise (adjust, engage, contend with).

While prevalent among some scholars, it could be intimidating for others in HCI and design to leave behind something so fundamental to their beliefs and hopes. That this

abandoning of the problem might present a kind of risk, a terror even, connected with ontological instability. To remove the problem seems to remove the grounding from solutions. As prior HCI scholarship has described [312; 310; 318], many invested in interaction and its design are left with nothing to hang on to.

- How can we work without a problem?
- Where should we begin? Who am I designing for?
- Who or what should I center?
- What does success look like for different stakeholders—how is it defined?
- How do we know when we have finished? Why am I doing this?

These are precisely the questions that we need to be asking to think differently about solutions. This is how we might begin to undo solutions, and think about the just and equitable lives we might, just might, make possible.

## 6.7 Conclusion: Forging a Path Towards Justice-Oriented AI

This dissertation, "Methods of Designing Justice-Oriented Interactive AI Systems," has been a journey of exploration, reflection, advocacy, and action. It is a testament to the power of centering marginalized voices in the development of technologies that have the potential to both uplift and oppress. By scrutinizing the intricate relationship between AI and the African American community, this research exposes the insidious ways in which systemic biases can be embedded within seemingly neutral algorithms and interfaces. Driven by the conviction that AI should serve as a tool for empowerment and liberation, rather than

perpetuating existing inequities, I have delved into the complex interplay between technology, race, and social justice. It has been the intention of my research and civic passions to illuminate the nuances of how AI systems can impact and marginalize underrepresented minority communities, and to identify pathways for more inclusive and equitable design.

Through three distinct investigations, I have examined the socio-technical experiences of African Americans interacting with AI systems in banking and natural language technologies, uncovering both challenges and opportunities. I have critically evaluated traditional user-centered design and research methods and advocated for a more robust, community-collaborative approaches that empowers Black communities (people and organizations) to actively shape the technologies that impact their lives. This research thus challenges the deficit-based narratives that often dominate discussions of marginalized communities and technology, highlighting the importance of recognizing and leveraging their cultural capacities as strengths in the design process, in which professional designers ought to learn from.

The Techno-Realist Innovation (TRD) Framework for Human-Centered Technology Research and Design, developed through this work, is a direct response to the limitations of neutrally-gazing design approaches. By prioritizing accountability, long-term partnerships, equitable outcomes, and the co-creation of knowledge, this framework offers a road map for building more accountable and just AI systems. It is a testament to the belief that true innovation cannot happen in a vacuum; it must be grounded in the lived experiences and aspirations of the communities it aims to serve.

My journey as a researcher has been deeply influenced by feminist scholars who have challenged dominant paradigms and advocated for a more inclusive and equitable approach to knowledge production. By embracing the concepts of situated knowledge, located accountabilities, and Black feminist thought, I have sought to center the voices and perspectives that are too often marginalized in the tech industry. This dissertation is a contribution to the growing body of work that seeks to disrupt the power imbalances inherent in traditional design processes and bridge the gap between theory and practice, advocating for a design

process that is not only human-centered but also justice-oriented.

This dissertation is not merely an academic exercise; it is a call to action. It is an invitation to researchers, designers, technologists, and community members to come together and re-imagine the relationship between AI and society. It is a challenge to the status quo, urging us to move beyond simplistic notions of "fairness" and "bias" and to embrace a more nuanced understanding of how technology can either reinforce or dismantle systemic inequalities. The findings of this research have far-reaching implications for the field of AI and beyond. They challenge us to rethink our assumptions about who gets to design technology, whose voices are heard, and whose needs are prioritized.

In the spirit of Dr. Martin Luther King, Jr.'s vision of a "person-oriented" society, I believe that AI has the potential to be a powerful tool for social good. But to realize this potential, we must actively engage with the complex social, cultural, and political contexts in which these technologies are embedded. We must move beyond the confines of traditional design methods and embrace a more collaborative, community-driven approach that prioritizes equity, inclusivity, and accountability. Only then can we ensure that AI systems truly serve the needs and aspirations of all members of our society. The work presented here is just the beginning. It is my hope that this dissertation will serve as a catalyst for further research, dialogue, and action toward constructing realities and futures of intelligent technology that centers the good of humanity.

# Bibliography


[1] D. Haraway, "Situated knowledges: The science question in feminism and the privilege of partial perspective," vol. 14, no. 3, p. 575, 1991.

[2] L. Suchman, "Located accountabilities in technology production," vol. 14, p. 16, 2002.

[3] J. Sherman, "Black feminist technoscience: Sojourner truth, storytelling, and a framework for design," in *Proceedings of the 2023 ACM Designing Interactive Systems Conference*, pp. 978–986, 2023.

[4] P. H. Collins, "The social construction of black feminist thought," vol. 14, no. 4, pp. 745–773, 1989. Publisher: University of Chicago Press.

[5] G. Öz and Timur, "Issues of power and representation in/of the local context: The role of self-reflexivity and positionality in design research," vol. 26, no. 2, pp. 252–269, 2023. Publisher: Routledge _eprint: https://doi.org/10.1080/14606925.2022.2088097.

[6] "Traps: African american men on gender and sexuality," 2001. Accepted: 2023T13:57:58Z.

[7] D. Haraway, "Situated knowledges: The science question in feminism and the privilege of partial perspective," vol. 14, no. 3, pp. 575–599, 1988. Publisher: Feminist Studies, Inc.

[8] D. Leslie, "Understanding artificial intelligence ethics and safety: A guide for the responsible design and implementation of AI systems in the public sector," 2019.

[9] T. Winograd, F. Flores, and F. F. Flores, *Understanding computers and cognition: A new foundation for design*. Norwood, NJ: Ablex Publishing Corporation, 1986.

[10] H. L. Dreyfus, *What computers still can't do: A critique of artificial reason*. MIT press, 1992.

[11] A. Brown, A. Chouldechova, E. Putnam-Hornstein, A. Tobin, and R. Vaithianathan, "Toward algorithmic accountability in public services: A qualitative study of affected community perspectives on algorithmic decision-making in child welfare services," in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 1–12, ACM, 2019.

[12] L. Dombrowski, E. Harmon, and S. Fox, "Social justice-oriented interaction design: Outlining key design strategies and commitments," in *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*, pp. 656–671, ACM, 2016.

[13] J. L. Cunningham, G. Benabdallah, D. K. Rosner, and A. S. Taylor, "On the grounds of solutionism: Ontologies of blackness and HCI," 2022. Just Accepted.

[14] S. Fox, J. Dimond, L. Irani, T. Hirsch, M. Muller, and S. Bardzell, "Social justice and design: Power and oppression in collaborative systems," in *Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, pp. 117–122, ACM, 2017.

[15] Z. Obermeyer, B. Powers, C. Vogeli, and S. Mullainathan, "Dissecting racial bias in an algorithm used to manage the health of populations," vol. 366, no. 6464, pp. 447–453, 2019.

[16] V. Prabhakaran and D. Martin, "Participatory machine learning using community-based system dynamics," vol. 22, no. 2, pp. 71–74, 2020-12.

[17] R. Benjamin, "Race after technology: Abolitionist tools for the new jim code," 2019.

[18] D. M. Charlton, *Black Software: The Internet & Racial Justice, from the Afronet to Black Lives Matter*. OXFORD University Press, 2021.

[19] D. Hankerson, A. R. Marshall, J. Booker, H. El Mimouni, I. Walker, and J. A. Rode, "Does technology have race?," in *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, pp. 473–486, 2016.

[20] A. D. R. Smith, A. A. Ahmed, A. Alvarado Garcia, B. Dosono, I. Ogbonnaya-Ogburu, Y. Rankin, A. To, and K. Toyama, "What's race got to do with it? engaging in race in HCI," in *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, pp. 1–8, ACM, 2020.

[21] J. Buolamwini and T. Gebru, "Gender shades: Intersectional accuracy disparities in commercial gender classification," in *Proceedings of the 1st Conference on Fairness, Accountability and Transparency*, pp. 77–91, PMLR, 2018. ISSN: 2640-3498.

[22] "Report on algorithmic risk assessment tools in the u.s. criminal justice system," 2019.

[23] C. Tolan, A. Ash, and R. Marsh, "The nation's largest credit union rejected more than half its black conventional mortgage applicants | CNN business," 2023.

[24] S. L. Blodgett, Q. V. Liao, A. Olteanu, R. Mihalcea, M. Muller, M. K. Scheuerman, C. Tan, and Q. Yang, "Responsible language technologies: Foreseeing and mitigating harms," in *CHI Conference on Human Factors in Computing Systems Extended Abstracts*, pp. 1–3, ACM, 2022.

[25] A. Koenecke, A. Nam, E. Lake, J. Nudell, M. Quartey, Z. Mengesha, C. Toups, J. R. Rickford, D. Jurafsky, and S. Goel, "Racial disparities in automated speech recognition," vol. 117, no. 14, pp. 7684–7689, 2020.

[26] Z. Mengesha, C. Heldreth, M. Lahav, J. Sublewski, and E. Tuennerman, ""i don't think these devices are very culturally sensitive."—impact of automated speech recognition errors on african americans," vol. 4, 2021.

[27] A. Hanna, E. Denton, A. Smart, and J. Smith-Loud, "Towards a critical race methodology in algorithmic fairness," in *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, FAT* '20, pp. 501–512, Association for Computing Machinery, 2020.

[28] I. F. Ogbonnaya-Ogburu, A. D. Smith, A. To, and K. Toyama, "Critical race theory for HCI," in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, pp. 1–16, ACM, 2020.

[29] A. Leyshon and N. Thrift, "Financial exclusion and the shifting boundaries of the financial system," vol. 28, no. 7, pp. 1150–1156, 1996. Publisher: SAGE Publications Sage UK: London, England.

[30] M. G. Long, "Informal borrowers and financial exclusion: the invisible unbanked at the intersections of race and gender," vol. 47, no. 4, pp. 363–403, 2020. Publisher: SAGE Publications Sage CA: Los Angeles, CA.

[31] P. Bond and R. Townsend, "Formal and informal financing in a chicago ethnic neighborhood," vol. 20, no. 4, pp. 3–27, 1996. Publisher: Federal Reserve Bank of Chicago.

[32] A. Lusardi, D. J. Schneider, and P. Tufano, "Financially fragile households: Evidence and implications," 2011.

[33] W. S. D. a. K. Mullen, "Black reparations and the racial wealth gap," 2020.

[34] S. L. Rhine, W. H. Greene, and M. Toussaint-Comeau, "The importance of check-cashing businesses to the unbanked: Racial/ethnic differences," vol. 88, no. 1, pp. 146–157, 2006. Publisher: MIT Press 238 Main St., Suite 500, Cambridge, MA 02142-1046, USA journals ....

[35] S. D. Ards and S. L. Myers, "The color of money: Bad credit, wealth, and race," vol. 45, no. 2, pp. 223–239, 2001. Publisher: SAGE Publications Inc.

[36] A. Robb and D. T. Robinson, "Testing for racial bias in business credit scores," vol. 50, no. 3, pp. 429–443, 2018-03.

[37] S. Howell, T. Kuchler, D. Snitkof, J. Stroebel, and J. Wong, "Automation in small business lending can reduce racial disparities: Evidence from the paycheck protection program," 2021-10.

[38] McKinsey, "The economic state of black america: What is and what could be | McKinsey."

[39] C. R. a. D. L. (CRADL), "CRADL report - black experiences in crypto." 2022.

[40] S. Deo and N. Sontakke, "User-centric explainability in fintech applications," pp. 481–488, Springer, 2021.

[41] H. Stewart and J. Jürjens, "Data security and consumer trust in FinTech innovation in germany," 2018. Publisher: Emerald Publishing Limited.

[42] S. Amrute and I. C. López, "A conversation with iván chaar lópez," vol. 28, no. 2, pp. 100–103, 2021. Publisher: ACM New York, NY, USA.

[43] M. Friedrich, "A look inside america's most popular consumer finance applications," p. 22.

[44] K. Hale, "Hip-hop's role in square's $40 billion cash app business success." Section: Personal Finance.

[45] S. Erete, A. Israni, and T. Dillahunt, "An intersectional approach to designing in the margins," vol. 25, no. 3, pp. 66–69, 2018.

[46] A. Gautam, D. Tatar, and S. Harrison, "Crafting, communality, and computing: Building on existing strengths to support a vulnerable population," in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, pp. 1–14, ACM, 2020.

[47] W. W. Winchester, "Engaging the black ethos: Afrofuturism as a design lens for inclusive technological innovation," p. 8.

[48] J. Eisenstein, "Natural language processing," p. 587.

[49] \. R. Tatman, "What is computational sociolinguistics? (and who's doing it?)," 2017.

[50] R. Dyal-Chand, "AUTOCORRECTING FOR WHITENESS," vol. 101, p. 97.

[51] J. R. Rickford and S. King, "LANGUAGE AND LINGUISTICS ON TRIAL: HEARING RACHEL JEANTEL (AND OTHER VERNACULAR SPEAKERS) IN THE COURTROOM AND BEYOND," vol. 92, no. 4, pp. 948–988, 2016. Publisher: Linguistic Society of America.

[52] K. D. Kinzler, *How You Say It: Why We Judge Others by the Way They Talk–And the Costs of This Hidden Bias*. Houghton Mifflin Harcourt Publishing Company, 2020.

[53] D. D. Rubin and K. Smith, "Effects of accent, ethnicity, and lecture topic on undergraduates' perceptions of nonnative english-speaking teaching assistants.," 1990. ISSN: 0147-1767.

[54] N. Deas, J. Grieser, S. Kleiner, D. Patton, E. Turcan, and K. McKeown, "Evaluation of african american language bias in natural language generation," 2023.

[55] A. L. Hoffmann, "Where fairness fails: data, algorithms, and the limits of antidiscrimination discourse," vol. 22, no. 7, pp. 900–915, 2019.

[56] R. Tatman, "Gender and dialect bias in YouTube's automatic captions," in *Proceedings of the First ACL Workshop on Ethics in Natural Language Processing*, pp. 53–59, Association for Computational Linguistics, 2017.

[57] S. Bird, "Decolonising speech and language technology," in *Proceedings of the 28th International Conference on Computational Linguistics*, pp. 3504–3519, International Committee on Computational Linguistics, 2020-12.

[58] A. B. Wassink, C. Gansen, and I. Bartholomew, "Uneven success: automatic speech recognition and ethnicity-related dialects," vol. 140, pp. 50–70, 2022.

[59] J. Dacon, "Towards a deep multi-layered dialectal language analysis: A case study of african-american english," 2022.

[60] S. L. Blodgett, S. Barocas, H. Daumé III, and H. Wallach, "Language (technology) is power: A critical survey of "bias" in NLP," in *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, pp. 5454–5476, Association for Computational Linguistics, 2020-07.

[61] S. Kapania, A. S. Taylor, and D. Wang, "A hunt for the snark: Annotator diversity in data practices," in *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, CHI '23, pp. 1–15, Association for Computing Machinery, 2023.

[62] K. W. Crenshaw, "Twenty years of critical race theory: Looking back to move forward," vol. 43, p. 1253, 2010. Publisher: HeinOnline.

[63] K. Crenshaw, "Demarginalizing the intersection of race and sex: A black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics," in *Living with Contradictions*, pp. 39–52, Routledge, 1 ed., 1994.

[64] I. Perry, "Cultural studies, critical race theory and some reflections on methods," vol. 50, p. 11, 2005.

[65] C. West, *Critical race theory: The key writings that formed the movement*. The New Press, 1995.

[66] J. Fortin, "Critical race theory: A brief history," 2021.

[67] K. M. Bridges, T. Keel, and O. K. Obasogie, "Introduction: Critical race theory and the health sciences," vol. 43, no. 2, pp. 179–182, 2017-05.

[68] T. Yosso, W. Smith, M. Ceja, and D. Solorzano, "Critical race theory, racial microaggressions, and campus racial climate for latina/o undergraduates," vol. 79, pp. 659–691, 2009.

[69] M. J. Matsuda, C. R. Lawrence, R. Delgado, and K. W. Crenshaw, *Words That Wound: Critical Race Theory, Assaultive Speech, and the First Amendment*. New perspectives on law, culture, and society, Routledge, 1 ed., 1993. Pages: viii–viii.

[70] Cathy O'Neil, *Weapons of Math Destruction : How Big Data Increases Inequality and Threatens Democracy*. Crown, 2016.

[71] V. Eubanks, *Automating inequality: How high-tech tools profile, police, and punish the poor*. St. Martin's Press, 2018.

[72] M. Huesemann and J. Huesemann, *Techno-fix: why technology won't save us or the environment*. New Society Publishers, 2011.

[73] S. U. Noble, *Algorithms of oppression*. New York University Press, 2018.

[74] J. Daniels, "Race and racism in internet studies: A review and critique," vol. 15, no. 5, pp. 695–719, 2013. Publisher: SAGE Publications.

[75] L. Nakamura, *Cybertypes: Race, Ethnicity, and Identity on the Internet*. Routledge, 2013.

[76] S. Browne, *Dark Matters: On the Surveillance of Blackness*. 2015.

[77] W. H. K. Chun, "Race and/as technology, or how to do things to race," in *Race after the Internet*, pp. 44–66, Routledge, 2013.

[78] J. L. Cunningham, "Collaboratively mitigating racial disparities in automated speech recognition and language technologies with african american english speakers: Community-collaborative and equity-centered approaches toward designing inclusive natural language systems," in *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems*, CHI EA '23, pp. 1–5, Association for Computing Machinery, 2023.

[79] M. Wong-Villacres, C. DiSalvo, N. Kumar, and B. DiSalvo, "Culture in action: Unpacking capacities to inform assets-based design," pp. 1–14, 2020.

[80] A. Swidler, "Culture in action: Symbols and strategies," vol. 51, no. 2, pp. 273–286, 1986. Publisher: [American Sociological Association, Sage Publications, Inc.].

[81] P. Bourdieu, "The forms of capital," in *The sociology of economic life*, pp. 78–92, Routledge, 2018.

[82] M. Wong-Villacres, C. DiSalvo, N. Kumar, and B. DiSalvo, "Culture in action: Unpacking capacities to inform assets-based design," in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, pp. 1–14, ACM, 2020.

[83] M. Wong-Villacres, A. Kumar, A. Vishwanath, N. Karusala, B. DiSalvo, and N. Kumar, "Designing for intersections," pp. 45–58, 2018.

[84] V. Prabhakaran, R. Qadri, and B. Hutchinson, "Cultural incongruencies in artificial intelligence," 2022.

[85] B. Friedman and H. Nissenbaum, "Bias in computer systems," vol. 14, no. 3, pp. 330–347, 1996.

[86] B. Friedman and D. G. Hendry, *Value sensitive design: Shaping technology with moral imagination*. Mit Press, 2019.

[87] S. Umbrello, "Beneficial artificial intelligence coordination by means of a value sensitive design approach," *Big Data and Cognitive Computing*, vol. 3, no. 1, p. 5, 2019.

[88] Q. V. Liao and M. Muller, "Enabling value sensitive ai systems through participatory design fictions," *arXiv preprint arXiv:1912.07381*, 2019.

[89] M. Jakesch, Z. Buçinca, S. Amershi, and A. Olteanu, "How different groups prioritize ethical values for responsible AI," in *2022 ACM Conference on Fairness, Accountability, and Transparency*, FAccT '22, pp. 310–323, Association for Computing Machinery, 2022.

[90] S. Umbrello and I. Van de Poel, "Mapping value sensitive design onto ai for social good principles," *AI and Ethics*, vol. 1, no. 3, pp. 283–296, 2021.

[91] J. Simon, P. H. Wong, and G. Rieder, "Algorithmic bias and the value sensitive design approach," *Internet Policy Review*, vol. 9, no. 4, pp. 1–16, 2020.

[92] H. Heuer and D. Buschek, "Methods for the design and evaluation of HCI+NLP systems," 2021.

[93] N. Mehrabi, F. Morstatter, N. Saxena, K. Lerman, and A. Galstyan, "A survey on bias and fairness in machine learning," vol. 54, no. 6, pp. 1–35, 2021-07.

[94] M. Sloane, E. Moss, O. Awomolo, and L. Forlano, "Participation is not a design fix for machine learning," p. 7, 2020.

[95] Q. Yang, J. Cranshaw, S. Amershi, S. T. Iqbal, and J. Teevan, "Sketching NLP: A case study of exploring the right things to design with language intelligence," in *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 1–12, ACM, 2019.

[96] S. Lindsay, K. Brittain, D. Jackson, C. Ladha, K. Ladha, and P. Olivier, "Empathy, participatory design and people with dementia," in *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12*, p. 521, ACM Press, 2012.

[97] N. Wallerstein, B. Duran, J. G. Oetzel, and M. Minkler, *Community-Based Participatory Research for Health: Advancing Social and Health Equity*. John Wiley & Sons, Incorporated, 2017.

[98] E. Sanders, "From user-centered to participatory design approaches," in *Design and the Social Sciences: Making Connections.*, pp. 1–7, 2002. Journal Abbreviation: Design and the Social Sciences: Making Connections.

[99] P. Wright and J. McCarthy, *Experience-Centered Design: Designers, Users, and Communities in Dialogue*. Synthesis Lectures on Human-Centered Informatics, Springer International Publishing, 2010.

[100] A. F. Cooper, E. Moss, B. Laufer, and H. Nissenbaum, "Accountability in an algorithmic society: Relationality, responsibility, and robustness in machine learning," in *2022 ACM Conference on Fairness, Accountability, and Transparency*, FAccT '22, pp. 864–876, Association for Computing Machinery, 2022.

[101] C. Harrington, S. Erete, and A. M. Piper, "Deconstructing community-based collaborative design: Towards more equitable participatory design engagements," vol. 3, pp. 1–25, 2019.

[102] G. R. Hayes, "The relationship of action research to human-computer interaction," vol. 18, no. 3, pp. 1–20, 2011-07.

[103] *Participatory design: Principles and practices*. Participatory design: Principles and practices, Lawrence Erlbaum Associates, Inc, 1993. Pages: xiii, 319.

[104] C. Spinuzzi, "The methodology of participatory design," p. 12.

[105] H. Nissenbaum, "How computer systems embody values," vol. 34, no. 3, pp. 120–119, 2001-03. Conference Name: Computer.

[106] B. Friedman, P. H. Kahn, and Jr., "Value sensitive design: Theory and methods," 2002.

[107] C. A. Le Dantec and S. Fox, "Strangers at the gate: Gaining access, building rapport, and co-constructing community-based research," in *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*, pp. 1348–1358, ACM, 2015.

[108] X. Wu, L. Xiao, Y. Sun, J. Zhang, T. Ma, and L. He, "A survey of human-in-the-loop for machine learning," *Future Generation Computer Systems*, vol. 135, pp. 364–381, 2022.

[109] C. N. Harrington, B. Johnson, D. Ford, and A. D. R. Smith, "Designing for the black experience," vol. 28, no. 5, pp. 22–27, 2021-09.

[110] J. Pierre, R. Crooks, M. Currie, B. Paris, and I. Pasquetto, "Getting ourselves together: Data-centered participatory design research & epistemic burden," in *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, pp. 1–11, ACM, 2021.

[111] H. Winschiers-Theophilus, S. Chivuno-Kuria, G. K. Kapuire, N. J. Bidwell, and E. Blake, "Being participated: a community approach," in *Proceedings of the 11th Biennial Participatory Design Conference on - PDC '10*, p. 1, ACM Press, 2010.

[112] R. N. Brewer, C. Harrington, and C. Heldreth, "Envisioning equitable speech technologies for black older adults," in *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency*, FAccT '23, pp. 379–388, Association for Computing Machinery, 2023.

[113] C. N. Harrington, S. Klassen, and Y. A. Rankin, ""all that you touch, you change": Expanding the canon of speculative design towards black futuring," pp. 1–10, 2022. Conference Name: CHI '22: CHI Conference on Human Factors in Computing Systems ISBN: 9781450391573 Place: New Orleans LA USA Publisher: ACM.

[114] M. Lundy, S. A. Desai, and J. Chin, "Bridging the gap between designers and users: Co-designing health-related voice user interface experiences with older adults," 2023.

[115] M. Parker, N. Wallerstein, B. Duran, M. Magarati, E. Burgess, S. Sanchez-Youngman, B. Boursaw, A. Heffernan, J. Garoutte, and P. Koegel, "Engage for equity: Development of community-based participatory research tools," vol. 47, pp. 359–371, 2020.

[116] S. Costanza-Chock, "Design justice: Towards an intersectional feminist framework for design theory and practice," 2018.

[117] J. Chun-Chung Chow and K. Crowe, "Community-based research and methods in community practice," *The Handbook of Community Practice. Thousand Oaks: Sage Publications, Inc*, pp. 604–619, 2005.

[118] M. Weil, M. S. Reisch, and M. L. Ohmer, *The Handbook of Community Practice*. SAGE Publications, 2012. Google-Books-ID: hYaZBAAAQBAJ.

[119] P. Freire, "Pedagogy of the oppressed," in *Toward a sociology of education*, pp. 374–386, Routledge, 2020.

[120] C. D'Ignazio and L. F. Klein, *Data Feminism.* MIT Press, 2020. Google-Books-ID: x5nSDwAAQBAJ.

[121] M. J. Muller and A. Druin, "Participatory design: The third space in human–computer interaction," in *Human Computer Interaction Handbook*, pp. 1125–1153, CRC Press, 2012.

[122] D. K. Sakaguchi-Tang, J. L. Cunningham, W. Roldan, J. Yip, and J. A. Kientz, "Co-design with older adults: Examining and reflecting on collaboration with aging communities," vol. 5, pp. 362:1–362:28, 2021.

[123] J. Dickinson, J. Arthur, M. Shiparski, A. Bianca, A. Gonzalez, and S. Erete, "Amplifying community-led violence prevention as a counter to structural oppression," *Proceedings of the ACM on Human-Computer Interaction*, vol. 5, no. CSCW1, pp. 1–28, 2021.

[124] S. Erete, J. Dickinson, A. C. Gonzalez, and Y. A. Rankin, "Unpacking the complexities of community-led violence prevention work," in *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems*, pp. 1–15, 2022.

[125] A. Grimes and R. Harper, "Celebratory technology: new directions for food research in HCI," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '08, pp. 467–476, Association for Computing Machinery, 2008.

[126] J. Tran O'Leary, S. Zewde, J. Mankoff, and D. K. Rosner, *Who Gets to Future? Race, Representation, and Design Methods in Africatown*, p. 1–13. New York, NY, USA: Association for Computing Machinery, 2019.

[127] H. Saksono, C. Castaneda-Sceppa, J. Hoffman, V. Morris, M. Seif El-Nasr, and A. G. Parker, "Storywell: designing for family fitness app motivation by using social rewards and reflection," in *Proceedings of the 2020 CHI conference on human factors in computing systems*, pp. 1–13, 2020.

[128] Y. A. Rankin and K. K. Henderson, "Resisting racism in tech design: Centering the experiences of black youth," vol. 5, pp. 1–32, 2021.

[129] S. Erete, Y. Rankin, and J. Thomas, "A method to the madness: Applying an intersectional analysis of structural oppression and power in HCI and design," vol. 30, no. 2, pp. 24:1–24:45, 2023.

[130] C. Harrington and T. R. Dillahunt, "Eliciting tech futures among black young adults: A case study of remote speculative co-design," in *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, CHI '21, pp. 1–15, Association for Computing Machinery, 2021.

[131] Y. A. Rankin, J. O. Thomas, and N. M. Joseph, "Intersectionality in HCI: lost in translation," vol. 27, no. 5, pp. 68–71, 2020-09.

[132] J. O. Thomas, Y. Rankin, R. Minor, and L. Sun, "Exploring the difficulties african-american middle school girls face enacting computational algorithmic thinking over three years while designing games for social change," *Computer Supported Cooperative Work (CSCW)*, vol. 26, pp. 389–421, 2017.

[133] A. Birhane, W. Isaac, V. Prabhakaran, M. Diaz, M. C. Elish, I. Gabriel, and S. Mohamed, "Power to the people? opportunities and challenges for participatory AI," in *Equity and Access in Algorithms, Mechanisms, and Optimization*, pp. 1–8, ACM, 2022.

[134] F. Delgado, S. Yang, M. Madaio, and Q. Yang, "Stakeholder participation in AI: Beyond "add diverse stakeholders and stir"," 2021.

[135] V. Gadiraju, S. Kane, S. Dev, A. Taylor, D. Wang, E. Denton, and R. Brewer, "" i wouldn't say offensive but...": Disability-centered perspectives on large language models," in *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency*, pp. 205–216, 2023.

[136] R. Qadri, R. Shelby, C. L. Bennett, and E. Denton, "Ai's regimes of representation: A community-centered study of text-to-image models in south asia," in *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency*, pp. 506–517, 2023.

[137] J. Smith-Loud, A. Smart, D. Neal, A. Ebinama, E. Corbett, P. Nicholas, Q. Rashid, A. Peckham, S. Murphy-Gray, N. Morris, E. S. Arrillaga, N.-M. Cotton, E. Almedom, O. Araiza, E. McCullough, A. Langston, and C. Nellum, "The equitable AI research roundtable (EARR): Towards community-based decision making in responsible AI development," 2023.

[138] J. A. Kuhlberg, I. Headen, E. A. Ballard, and D. Martin Jr, "Advancing community engaged approaches to identifying structural drivers of racial bias in health diagnostic algorithms," *arXiv preprint arXiv:2305.13485*, 2023.

[139] Y.-C. H. Nourbakhsh, Illah, "When human-computer interaction meets community citizen science."

[140] B. A. Israel, E. Eng, A. J. Schulz, and E. A. Parker, "Methods in community-based participatory research for health," p. 523.

[141] T. Bratteteig and I. Wagner, "Unpacking the notion of participation in participatory design," *Computer Supported Cooperative Work (CSCW)*, vol. 25, pp. 425–475, 2016.

[142] U. Tandon, V. Khovanskaya, E. Arcilla, M. H. Hussein, P. Zschiesche, and L. Irani,

"Hostile ecologies: Navigating the barriers to community-led innovation," *Proceedings of the ACM on Human-Computer Interaction*, vol. 6, no. CSCW2, pp. 1–26, 2022.

[143] C. Del Gaudio, A. J. de Oliveira, and C. Franzato, "The influence of local powers on participatory design processes in marginalized conflict areas," in *Proceedings of the 13th Participatory Design Conference on Research Papers - PDC '14*, pp. 131–139, ACM Press, 2014.

[144] S. Costanza-Chock, "Design justice, a.i., and escape from the matrix of domination," 2018.

[145] S. Bardzell, "Feminist HCI: taking stock and outlining an agenda for design," in *Proceedings of the 28th international conference on Human factors in computing systems - CHI '10*, p. 1301, ACM Press, 2010.

[146] S. Erete and J. O. Burrell, "Empowered participation: How citizens use technology in local governance," in *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pp. 2307–2319, ACM, 2017.

[147] Y. A. Rankin and J. O. Thomas, "Straighten up and fly right: rethinking intersectionality in HCI research," vol. 26, no. 6, pp. 64–68, 2019.

[148] A. Schlesinger, W. K. Edwards, and R. E. Grinter, "Intersectional HCI: Engaging identity through gender, race, and class," in *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pp. 5412–5427, ACM, 2017.

[149] S. Vossoughi, P. K. Hooper, and M. Escudé, "Making through the lens of culture and power: Toward transformative visions for educational equity," *Harvard educational review*, vol. 86, no. 2, pp. 206–232, 2016.

[150] K. Davidson, A. Bell, R. Riedy, C. Sandoval, C. Wegemer, T. Clark, C. Farrell, B. Fishman, J. Russell, W. R. Penuel, *et al.*, "Preparing researchers to participate in collaborative research," 2020.

[151] a. m. brown, *Emergent Strategy: Shaping Change, Changing Worlds*. AK Press, 2017.

[152] S. Costanza-Chock, "Design justice: Community-led practices to build the worlds we need,"

[153] N. Farmer, F. Osei Baah, F. Williams, E. Ortiz-Chapparo, V. M. Mitchell, L. Jackson, B. Collins, L. Graham, G. R. Wallen, T. M. Powell-Wiley, and A. Johnson, "Use of a community advisory board to build equitable algorithms for participation in clinical trials: a protocol paper for HoPeNET," vol. 29, no. 1, p. e100453, 2022.

[154] J. Mitchell, T. Perry, V. Rorai, J. Ilardo, P. A. Lichtenberg, and J. S. Jackson, "Building and sustaining a community advisory board of african american older adults as the foundation for volunteer research recruitment and retention in health sciences," vol. 30, pp. 755–764.

[155] B. Pratt, K. M. Lwin, D. Zion, F. Nosten, B. Loff, and P. Y. Cheah, "Exploitation and community engagement: Can community advisory boards successfully assume a role minimising exploitation in international research?," vol. 15, no. 1, pp. 18–26, 2015. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1111/dewb.12031.

[156] "Fintech investments have hit 91.5 billion in 2021, nearly doubling last year's total." Retrieved February 18, 2022 from.

[157] T. Friedline, S. Naraharisetti, and A. Weaver, "Digital redlining: Poor rural communities' access to fintech and implications for financial inclusion," vol. 24, no. 5, pp. 517–541, 2020. Publisher: Taylor & Francis.

[158] J. L. Cunningham, S. T. Nguyen, J. A. Kientz, and D. Rosner, "The cost of culture: An analysis of cash app and the financial inclusion of black american communities," in *Designing Interactive Systems Conference*, DIS '22, pp. 612–628, Association for Computing Machinery, 2022.

[159] "Nonwhite borrowers more likely to have costlier mortgages — bankrate." Retrieved February 18, 2022 from.

[160] C. Bessière, "The financial diaries: How american families cope in a world of uncertainty," 2018. Publisher: JSTOR.

[161] R. Talhouk, K. Morrissey, S. Fox, N. Pantidi, E. Simpson, L. E. Michie, and M. Balaam, "Human computer interaction & health activism," pp. 1–4, 2018.

[162] C. Harrington, D. Rosner, A. Taylor, and M. Wiberg, "Engaging race in HCI," vol. 28, no. 5, pp. 5–5, 2021. Publisher: ACM New York, NY, USA.

[163] C. Crafting and Computing, "Building on existing strengths to support a vulnerable population —," in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. Retrieved February 18, 2022 from.

[164] "A call for action: Conceptualizing assets-based inclusive design as a social movement to address systemic inequities —," in *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*. Retrieved February 18, 2022 from.

[165] P. Bourdieu, "The economics of linguistic exchanges," vol. 16, no. 6, pp. 645–668, 1977. Publisher: SAGE Publications Ltd.

[166] R. D. Kelley, "What did cedric robinson mean by racial capitalism?," vol. 12, 2017.

[167] C. J. Robinson, *Black Marxism, revised and updated third edition: The making of the black radical tradition*. UNC press Books, 2020.

[168] K. Datta and V. Guermond, "Remittances in times of crisis: Reflections on labour, social reproduction, and digitisation during covid-19," 2020.

[169] "Fdic national survey of unbanked and underbanked households," 2015.

[170] P. F. Lau, *Democracy rising: South Carolina and the fight for Black equality since 1865*. University Press of Kentucky, 2006.

[171] I. Becci and J. Dubler, "Religion and religions in prisons: Observations from the united states and europe," vol. 56, no. 2, pp. 241–247, 2017. Publisher: Wiley Online Library.

[172] N. Sarkisian and N. Gerstel, "Kin support among blacks and whites: Race and family organization," vol. 69, no. 6, pp. 812–837, 2004. Publisher: Sage Publications Sage CA: Los Angeles, CA.

[173] D. Stanley and R. Bhattacharya, "The informal financial sector in the us: The role of remittances," *The Quarterly Review of Economics and Finance*, vol. 48, 1, p. 1–21, 2008.

[174] S. Fosso Wamba, J. R. Kala Kamdjoug, R. Epie Bawack, and J. G. Keogh, "Bitcoin, blockchain and fintech: a systematic review and case studies in the supply chain," vol. 31, no. 2, pp. 115–142, 2020.

[175] E. K. Clemons, R. M. Dewan, R. J. Kauffman, and T. A. Weber, "Understanding the information-based transformation of strategy and society," vol. 34, no. 2, pp. 425–456, 2017. Publisher: Taylor & Francis.

[176] S. H. Muralidhar, "Making digital money "work" for low-income users: Critical reflections for HCI," vol. 11, no. 4, pp. 49–65, 2019. Publisher: IGI Global.

[177] B. M. Abu and I. Haruna, "Financial inclusion and agricultural commercialization in ghana: an empirical investigation," 2017. Publisher: Emerald Publishing Limited.

[178] A. Giridharadas, *Winners take all: The elite charade of changing the world.* Vintage, 2019.

[179] R. Benjamin, "Innovating inequity: If race is a technology, postracialism is the genius bar," vol. 39, no. 13, pp. 2227–2234, 2016. Publisher: Taylor & Francis.

[180] M. Karenga, "Introduction to black studies," 1993. Publisher: Sage Publishing Ltd. London.

[181] M. López, "African americans in the united states economy: A legacy of," p. 13.

[182] R. E. Wright, *Financial Exclusion: How Competition Can Fix a Broken System.* American Institute for Economic Research, 2019.

[183] "Race and twentieth-century american economic history." Retrieved February 19, 2022 from.

[184] S. P. Gangadharan, "Digital inclusion and data profiling," 2012.

[185] M. Caraway, D. A. Epstein, and S. A. Munson, "Friends don't need receipts: The curious case of social awareness streams in the mobile payment app venmo," vol. 1, pp. 1–17, 2017.

[186] "Credit scoring and insurance: Costing consumers billions and perpetuating the economic racial divide." Retrieved February 18, 2022 from.

[187] "Hip-hop loves cash app, and that might be why jack dorsey bought tidal — gq." Retrieved February 19, 2022 from.

[188] "Six months later, no one can top "the box," 2020. Retrieved February 19, 2022 from.

[189] "Genius — song lyrics  knowledge." Retrieved February 19, 2022 from.

[190] T. R. Dillahunt, S. Erete, R. Galusca, A. Israni, D. Nacu, and P. Sengers, "Reflections on design methods for underserved communities," in *Companion of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, CSCW '17 Companion, pp. 409–413, Association for Computing Machinery, 2017.

[191] M. Wong-Villacres, S. Erete, A. Gautam, A. Ismail, N. Kumar, L. Pei, W. Roldan, V. Ahumada-Newhart, K. Badillo-Urquiola, J. M. Hernandez, A. Poon, P. Reynolds-Cuéllar, and V. G. Motti, "Elevating strengths and capacities: the different shades of assets-based design in HCI," vol. 29, no. 5, pp. 28–33, 2022.

[192] M. Wong-Villacres, A. Gautam, W. Roldan, L. Pei, J. Dickinson, A. Ismail, B. DiSalvo, N. Kumar, T. Clegg, S. Erete, E. Roden, N. Sambasivan, and J. Yip, "From needs to strengths: Operationalizing an assets-based design of technology," in *Conference Companion Publication of the 2020 on Computer Supported Cooperative Work and Social Computing*, pp. 527–535, ACM, 2020.

[193] A. Cho, R. G. Herrera, L. Chaidez, and A. Uriostegui, "The" comadre" project: An asset-based design approach to connecting low-income latinx families to out-of-school learning opportunities," 2019.

[194] L. Pei and B. Nardi, "We did it right, but it was still wrong: Toward assets-based design," pp. 1–11, 2019.

[195] Federal Reserve Bank of San Francisco, "Fintech, racial equity, and an inclusive financial system," vol. 15, no. 2, pp. 001–132, 2021.

[196] K. W. Crenshaw, "Twenty years of critical race theory: Looking back to move forward," *Conn. L. Rev*, vol. 43, p. 1253, 2010.

[197] J. J. Schensul and M. D. LeCompte, *Essential ethnographic methods: A mixed methods approach*, vol. 3. Rowman Altamira, 2012.

[198] J. W. Creswell and J. D. Creswell, *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications, 2017.

[199] S. E. Hove and B. Anda, "Experiences from conducting semi-structured interviews in empirical software engineering research," pp. 10–pp, IEEE, 2005.

[200] R. Kashian, R. Tao, and C. Perez-Valdez, "Banking the unbanked : Bank deserts in the united states," 2015.

[201] A. Brock and J. A. Brock, *Distributed blackness*. New York University Press, 2020.

[202] "Federal reserve bank of san francisco community development," *Federal Reserve Bank of San Francisco, Community Development Innovation Review Series*, vol. 15, 2, p. 001–132, 2021.

[203] L. Swartz, *New Money*. Yale University Press, 2020.

[204] L. Cameron, A. Christin, M. Ann DeVito, T. R. Dillahunt, M. Elish, M. Gray, R. Qadri, N. Raval, M. Valentine, and E. Anne Watkins, ""this seems to work": Designing technological systems with the algorithmic imaginations of those who labor," pp. 1–5, 2021.

[205] N. Raval, "Interrupting invisibility in a global world," vol. 28, no. 4, pp. 27–31, 2021. Publisher: ACM New York, NY, USA.

[206] N. Kumar, A. Ismail, S. Sherugar, and R. Chandwani, "Restoration work: Responding to everyday challenges of HIV outreach," vol. 3, pp. 1–26, 2019. Publisher: ACM New York, NY, USA.

[207] T. J. Yosso, "Whose culture has capital? a critical race theory discussion of community cultural wealth," in *Critical race theory in education*, pp. 181–204, Routledge, 2014.

[208] A. Jones-Armstrong, "The spirit and the subprime: Race, risk, and our common dispossession," vol. 98, no. 1, pp. 51–69, 2016. Publisher: SAGE Publications Sage UK: London, England.

[209] W. arity and K. Mullen., "Black reparations and the racial wealth gap," 2020. Retrieved February 19, 2022 from.

[210] A. Cho, R. G. Herrera, L. Chaidez, and A. Uriostegui, "The" comadre" project: An asset-based design approach to connecting low-income latinx families to out-of-school learning opportunities," pp. 1–14, 2019.

[211] S. Bardzell, "Feminist hci: taking stock and outlining an agenda for design," in *Proceedings of the 28th international conference on Human factors in computing systems*, 2010. CHI '10, 1301.

[212] S. Benford, C. Greenhalgh, B. Anderson, R. Jacobs, M. Golembewski, M. Jirotka, B. C. Stahl, J. Timmermans, G. Giannachi, M. Adams, J. R. Farr, N. Tandavanitj, and K. Jennings, "The ethical implications of HCI's turn to the cultural," vol. 22, no. 5, pp. 24:1–24:37, 2015.

[213] B. Brown, A. Weilenmann, D. McMillan, and A. Lampinen, "Five provocations for ethical HCI research," in *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pp. 852–863, ACM, 2016.

[214] L. E. J. Hansson, T. Cerratto Pargman, and D. S. Pargman, "A decade of sustainable HCI: Connecting SHCI to the sustainable development goals," in *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, CHI '21, pp. 1–19, Association for Computing Machinery, 2021.

[215] D. M. Mertens, *Transformative research and evaluation*. Guilford press, 2008.

[216] D. M. Mertens, *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods*. Sage publications, 2023.

[217] A. Baker-Bell, *Linguistic Justice: Black Language, Literacy, Identity, and Pedagogy*. Routledge, 2020. Google-Books-ID: uTXfDwAAQBAJ.

[218] M. Sap, D. Card, S. Gabriel, Y. Choi, and N. A. Smith, "The risk of racial bias in hate speech detection," in *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, pp. 1668–1678, Association for Computational Linguistics, 2019.

[219] E. M. Bender and B. Friedman, "Data statements for natural language processing: Toward mitigating system bias and enabling better science," *Transactions of the Association for Computational Linguistics*, vol. 6, pp. 587–604, 2018.

[220] N. Goyal, I. Kivlichan, R. Rosen, and L. Vasserman, "Is your toxicity my toxicity? exploring the impact of rater identity on toxicity annotation," 2022.

[221] M. Muller, I. Lange, D. Wang, D. Piorkowski, J. Tsay, Q. V. Liao, C. Dugan, and T. Erickson, "How data science workers work with data: Discovery, capture, curation, design, creation," in *Proceedings of the 2019 CHI conference on human factors in computing systems*, pp. 1–15, 2019.

[222] R. Denton, M. Díaz, I. Kivlichan, V. Prabhakaran, and R. Rosen, "Whose ground truth? accounting for individual and collective identities underlying dataset annotation," 2021.

[223] S. Lazar and A. Nelson, "Ai safety on whose terms?," 2023.

[224] A. Paullada, I. D. Raji, E. M. Bender, E. Denton, and A. Hanna, "Data and its (dis) contents: A survey of dataset development and use in machine learning research," *Patterns*, vol. 2, no. 11, 2021.

[225] T. Gebru, J. Morgenstern, B. Vecchione, J. W. Vaughan, H. Wallach, H. D. Iii, and K. Crawford, "Datasheets for datasets," vol. 64, no. 12, pp. 86–92, 2021-12.

[226] K. Holstein, J. Wortman Vaughan, H. Daumé III, M. Dudik, and H. Wallach, "Improving fairness in machine learning systems: What do industry practitioners need?," in *Proceedings of the 2019 CHI conference on human factors in computing systems*, pp. 1–16, 2019.

[227] Z. Liu and N. Garg, "Equity in resident crowdsourcing: Measuring under-reporting without ground truth data," in *Proceedings of the 23rd ACM Conference on Economics and Computation*, EC '22, pp. 1016–1017, Association for Computing Machinery, 2022.

[228] F. Diaz and M. Madaio, "Scaling laws do not scale," 2023.

[229] B. Hutchinson, V. Prabhakaran, E. Denton, K. Webster, Y. Zhong, and S. Denuyl, "Social biases in NLP models as barriers for persons with disabilities," in *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics* (D. Jurafsky, J. Chai, N. Schluter, and J. Tetreault, eds.), (Online), pp. 5491–5501, Association for Computational Linguistics, July 2020.

[230] R. Kamikubo, L. Wang, C. Marte, A. Mahmood, and H. Kacorri, "Data representativeness in accessibility datasets: A meta-analysis," in *Proceedings of the 24th International ACM SIGACCESS Conference on Computers and Accessibility*, ASSETS '22, pp. 1–15, Association for Computing Machinery, 2022.

[231] M. Mitchell, S. Wu, A. Zaldivar, P. Barnes, L. Vasserman, B. Hutchinson, E. Spitzer, I. D. Raji, and T. Gebru, "Model cards for model reporting," in *Proceedings of the Conference on Fairness, Accountability, and Transparency*, pp. 220–229, 2019.

[232] R. Mathur, C. T. Rentsch, K. Venkataraman, S. Fatumo, M. Jobe, C. Angkurawaranon, S. E. Ong, A. Y. Wong, and M. K. Siddiqui, "How do we collect good-quality data

on race and ethnicity and address the trust gap?," *The Lancet*, vol. 400, no. 10368, pp. 2028–2030, 2022.

[233] M. Sap, D. Card, S. Gabriel, Y. Choi, and N. A. Smith, "The risk of racial bias in hate speech detection," in *Proceedings of the 57th annual meeting of the association for computational linguistics*, pp. 1668–1678, 2019.

[234] J. Berg, "Income security in the on-demand economy: Findings and policy lessons from a survey of crowdworkers," vol. 37, p. 543, 2015.

[235] L. Posch, A. Bleier, F. Flöck, C. M. Lechner, K. Kinder-Kurlanda, D. Helic, and M. Strohmaier, "Characterizing the global crowd workforce: A cross-country comparison of crowdworker demographics," vol. 9, no. 1, 2022.

[236] C. Schumann, G. O. Olanubi, A. Wright, E. Monk Jr., C. Heldreth, and S. Ricco, "Consensus and subjectivity of skin tone annotation for ML fairness," 2023.

[237] C. M. Heldreth, E. P. Monk, A. T. Clark, C. Schumann, X. Eyee, and S. Ricco, "Which skin tone measures are the most inclusive? an investigation of skin tone measures for artificial intelligence," *ACM Journal on Responsible Computing*, vol. 1, no. 1, pp. 1–21, 2024.

[238] E. S. Jo and T. Gebru, "Lessons from archives: strategies for collecting sociocultural data in machine learning," in *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency*, FAT* '20, pp. 306–316, Association for Computing Machinery, 2020.

[239] K. Ziman, A. C. Heusser, P. C. Fitzpatrick, C. E. Field, and J. R. Manning, "Is automatic speech-to-text transcription ready for use in psychological experiments?," *Behavior research methods*, vol. 50, pp. 2597–2605, 2018.

[240] M. Miceli, T. Yang, A. Alvarado Garcia, J. Posada, S. M. Wang, M. Pohl, and A. Hanna, "Documenting data production processes: A participatory approach for data work," vol. 6, pp. 510:1–510:34, 2022.

[241] I. D. Raji, E. M. Bender, A. Paullada, E. Denton, and A. Hanna, "AI and the everything in the whole wide world benchmark," 2021.

[242] M. Sloane, E. Moss, O. Awomolo, and L. Forlano, "Participation is not a design fix for machine learning," *CoRR*, vol. abs/2007.02423, 2020.

[243] "The EU artificial intelligence (AI) act."

[244] "Blueprint for an AI bill of rights | OSTP."

[245] "Strengthening and democratizing the u.s. artificial intelligence innovation ecosystem: An implementation plan for a national artificial intelligence research resource," 2023-01.

[246] J. Hill, K. Ogle, M. Gottlieb, S. A. Santen, and A. R. Artino Jr, "Educator's blueprint: A how-to guide for collecting validity evidence in survey- based research," vol. 6, no. 6, p. e10835, 2022. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/aet2.10835.

[247] D. University, "Compsci 240: Race, gender, class, & computing." Course offered at Duke University, 2021.

[248] J. L. Cunningham, "Society and inclusive technology design pedagogy: a digital zine," vol. 28, no. 5, pp. 12–13, 2021.

[249] J. Smith-Loud, A. Smart, D. Neal, A. Ebinama, E. Corbett, P. Nicholas, Q. Rashid, A. Peckham, S. Murphy-Gray, N. Morris, *et al.*, "The equitable ai research roundtable (earr): Towards community-based decision making in responsible ai development," *arXiv preprint arXiv:2303.08177*, 2023.

[250] D. L. Baldwin, *In the shadow of the ivory tower: How universities are plundering our cities*. Bold Type Books, 2021.

[251] C. Harrington, S. Erete, and A. M. Piper, "Deconstructing community-based collaborative design: Towards more equitable participatory design engagements," *Proceedings of the ACM on Human-Computer Interaction*, vol. 3, no. CSCW, pp. 1–25, 2019.

[252] D. Schroeder, K. Chatfield, M. Singh, R. Chennells, and P. Herissone-Kelly, *Equitable Research Partnerships: A Global Code of Conduct to Counter Ethics Dumping*. SpringerBriefs in Research and Innovation Governance, Springer International Publishing, 2019.

[253] J. Nee, G. M. Smith, A. Sheares, and I. Rustagi, "Linguistic justice as a framework for designing, developing, and managing natural language processing tools," vol. 9, no. 1, p. 20539517221090930, 2022. Publisher: SAGE Publications Ltd.

[254] CRL, ""creative reaction lab"." `https://www.creativereactionlab.com`. Accessed: 2020.

[255] E. Stolterman, "The nature of design practice and implications for interaction design research," *International Journal of Design*, vol. 2, no. 1, 2008.

[256] C. Satchell and P. Dourish, "Beyond the user: Use and non-use in hci," in *Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design: Open 24/7*, OZCHI '09, (New York, NY, USA), p. 9–16, Association for Computing Machinery, 2009.

[257] S. Bødker, "When second wave hci meets third wave challenges," in *Proceedings of the 4th Nordic conference on Human-computer interaction: changing roles*, pp. 1–8, 2006.

[258] A. L. Hoffmann, "Even when you are a solution you are a problem: An uncomfortable reflection on feminist data ethics," *Global Perspectives*, vol. 2, no. 1, 2021.

[259] M. Sicart and I. Shklovski, "'pataphysical software: (ridiculous) technological solutions for imaginary problems," in *Proceedings of the 2020 ACM Designing Interactive Systems Conference*, DIS '20, (New York, NY, USA), p. 1859–1871, Association for Computing Machinery, 2020.

[260] S. Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism*. NYU Press, 2018.

[261] R. Benjamin, *Race After Technology: Abolitionist Tools for the New Jim Code*. Wiley, 2019.

[262] R. Benjamin, ed., *Captivating technology: Race, carceral technoscience, and liberatory imagination in everyday life*. Duke University Press, 2019.

[263] S. Avle, D. Li, and S. Lindtner, "Responsible iot after techno-solutionism," *ThingsCon Report: The State of Responsible Internet of Things 2018*, 2018.

[264] M. Broussard, *Artificial Unintelligence: How Computers Misunderstand the World*. Mit Press, MIT Press, 2019.

[265] I. F. Ogbonnaya-Ogburu, A. D. Smith, A. To, and K. Toyama, "Critical race theory for hci," in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, pp. 1–16, 2020.

[266] S. Browne, *Dark matters: On the surveillance of blackness*. Duke University Press, 2015.

[267] C. D. McIlwain, *Black software: The internet and racial justice, from the Afronet to Black lives matter*. Oxford University Press, USA, 2019.

[268] Y. A. Rankin, J. O. Thomas, and N. M. Joseph, "Intersectionality in hci: Lost in translation," *Interactions*, vol. 27, no. 5, pp. 68–71, 2020.

[269] Y. A. Rankin and J. O. Thomas, "Straighten up and fly right: Rethinking intersectionality in hci research," *Interactions*, vol. 26, no. 6, pp. 64–68, 2019.

[270] S. Erete, A. Israni, and T. Dillahunt, "An intersectional approach to designing in the margins," *Interactions*, vol. 25, no. 3, pp. 66–69, 2018.

[271] K. Bray and C. Harrington, "Speculative blackness: Considering afrofuturism in the creation of inclusive speculative design probes," in *Designing Interactive Systems Conference 2021*, pp. 1793–1806, 2021.

[272] K. Reynolds, "Black literary technoculture and afrofuturist rupture," *Interactions*, vol. 28, no. 6, pp. 8–9, 2021.

[273] A. Brock, "Critical technocultural discourse analysis," *New Media & Society*, vol. 20, no. 3, pp. 1012–1030, 2018.

[274] M. Kranzberg, "Technology and history: "kranzberg's laws"," vol. 27, no. 3, pp. 544–560, 1986. Publisher: [The Johns Hopkins University Press, Society for the History of Technology].

[275] A. Oulasvirta and K. Hornbæk, "Hci research as problem-solving," in *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pp. 4956–4967, 2016.

[276] E. Encinas and M. Blythe, "The solution printer: magic realist design fiction," in *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, pp. 387–396, 2016.

[277] S. Rosenbak, "The science of imagining solutions," *Unpublished Doctoral dissertation*, 2018.

[278] C. Bell, "My problem with design," *Ubiquity*, vol. 2008, sep 2008.

[279] M. Blythe, K. Andersen, R. Clarke, and P. Wright, "Anti-solutionist strategies: Seriously silly design fiction," in *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, pp. 4968–4978, 2016.

[280] A. Giridharadas, *Winners take all: The elite charade of changing the world*. Vintage, 2019.

[281] M. Blythe, J. Steane, J. Roe, and C. Oliver, "Solutionism, the game: design fictions for positive aging," in *Proceedings of the 33rd annual ACM conference on human factors in computing systems*, pp. 3849–3858, 2015.

[282] S. Hartman, *Lose your mother: A journey along the Atlantic slave route*. Macmillan, 2008.

[283] C. L. Warren, *Ontological terror: Blackness, nihilism, and emancipation*. Duke University Press, 2018.

[284] B. Kapoor and S. Sharma, "A comparative study ontology building tools for semantic web applications," *International Journal of Web & Semantic Technology*, vol. 1, no. 3, pp. 1–13, 2010.

[285] A. Escobar, *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds*. New Ecologies for the Twenty-First Century, Duke University Press, 2018.

[286] R. Amaro, "As if," *e-flux architecture*, vol. 97, Feb. 2018.

[287] L. Irani, *Chasing innovation: Making entrepreneurial citizens in modern India*. Princeton University Press, 2019.

[288] A. Pacey, "Meaning in technology," vol. 10, no. 2, p. 243, 2001-04.

[289] A. Pacey, *The culture of technology*. The MIT Press, 1983.

[290] T. Fry, *Becoming human by design*. A&C Black, 2013.

[291] C. Tonkinwise, "Is design finished? dematerialisation and changing things," *Design philosophy papers*, vol. 2, no. 3, pp. 177–195, 2004.

[292] A. Ansari, "Plural bodies, pluriversal humans: Questioning the ontology of 'body'in design," *Somatechnics*, vol. 10, no. 3, pp. 286–305, 2020.

[293] A.-M. Willis, "Ontological designing," *Design philosophy papers*, vol. 4, no. 2, pp. 69–92, 2006.

[294] C. J. Robinson, *Black Marxism: The making of the Black radical tradition*. Penguin UK, 2021.

[295] S. Bardzell, J. Bardzell, J. Forlizzi, J. Zimmerman, and J. Antanitis, "Critical design and critical theory: The challenge of designing for provocation," in *Proceedings of the Designing Interactive Systems Conference*, DIS '12, (New York, NY, USA), p. 288–297, Association for Computing Machinery, 2012.

[296] F. Turner, "The rise of the internet and a new age of authoritarianism," *Harper's Magazine*, 2019.

[297] M. G. Ames, *The charisma machine: The life, death, and legacy of One Laptop per Child*. MIT Press, 2019.

[298] H. W. Rittel and M. M. Webber, "Dilemmas in a general theory of planning," *Policy sciences*, vol. 4, no. 2, pp. 155–169, 1973.

[299] WATBD?, ""where are the black designers? website"." `https://www.watbd.org/`, 2020.

[300] E. Tuck and K. W. Yang, "Decolonization is not a metaphor," *Tabula Rasa*, no. 38, pp. 61–111, 2021.

[301] M. Asad, "Prefigurative design as a method for research justice," *Proceedings of the ACM on Human-Computer Interaction*, vol. 3, no. CSCW, pp. 1–18, 2019.

[302] E. P. Baumer and M. S. Silberman, "When the implication is not to design (technology)," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 2271–2274, 2011.

[303] J. Pierce, "Undesigning technology: considering the negation of design by design," in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pp. 957–966, 2012.

[304] J. Pierce, "Working by not quite working: Resistance as a technique for alternative and oppositional designs," 2015.

[305] C. Satchell and P. Dourish, "Beyond the user: use and non-use in hci," in *Proceedings of the 21st annual conference of the Australian computer-human interaction special interest group: Design: Open 24/7*, pp. 9–16, 2009.

[306] C. L. Warren, *Ontological Terror: Blackness, Nihilism and Emancipation*. Duke University Press, 2018.

[307] C. N. Harrington, S. Klassen, and Y. A. Rankin, ""all that you touch, you change": Expanding the canon of speculative design towards black futuring," in *CHI Conference on Human Factors in Computing Systems*, pp. 1–10, 2022.

[308] C. Harrington and T. R. Dillahunt, "Eliciting tech futures among black young adults: A case study of remote speculative co-design," in *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, pp. 1–15, 2021.

[309] K. E. Bray, C. Harrington, A. G. Parker, N. Diakhate, and J. Roberts, "Radical futures: Supporting community-led design engagements through an afrofuturist speculative de-

sign toolkit," in *CHI Conference on Human Factors in Computing Systems*, pp. 1–13, 2022.

[310] C. Parra, D. Nemer, D. Hakken, and V. D'Andrea, "Deep trust in the future of community informatics," *The Journal of Community Informatics*, vol. 11, no. 2, 2015.

[311] S. Ghoshal and A. Bruckman, "The role of social computing technologies in grassroots movement building," *ACM Transactions on Computer-Human Interaction (TOCHI)*, vol. 26, no. 3, pp. 1–36, 2019.

[312] C. Harrington, Y. Rankin, J. Jones, R. Brewer, S. Erete, T. Dillahunt, and Q. Brown, "A call to action for the acm," *ACM Interactions*, 2020.

[313] G. R. Hayes, "The relationship of action research to human-computer interaction," *ACM Transactions on Computer-Human Interaction (TOCHI)*, vol. 18, no. 3, pp. 1–20, 2011.

[314] Y. A. Rankin and I. Irish, "A seat at the table: Black feminist thought as a critical framework for inclusive game design," *Proceedings of the ACM on Human-Computer Interaction*, vol. 4, no. CSCW2, pp. 1–26, 2020.

[315] C. N. Harrington, "The forgotten margins: what is community-based participatory health design telling us?," *Interactions*, vol. 27, no. 3, pp. 24–29, 2020.

[316] C. L. Bennett and D. K. Rosner, "The promise of empathy: Design, disability, and knowing the" other"," in *Proceedings of the 2019 CHI conference on human factors in computing systems*, pp. 1–13, 2019.

[317] L. Nakamura, "Feeling good about feeling bad: Virtuous virtual reality and the automation of racial empathy," *Journal of Visual Culture*, vol. 19, no. 1, pp. 47–64, 2020.

[318] S. Ghoshal, R. Mendhekar, and A. Bruckman, "Toward a grassroots culture of technology practice," *Proceedings of the ACM on Human-Computer Interaction*, vol. 4, no. CSCW1, pp. 1–28, 2020.