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Sociotechnical Food Justice: Examining and Designing Public Interventions for Systemic Social Issues

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Sociotechnical Food Justice:

Examining and Designing Public Interventions for Systemic Social Issues

DISSERTATION

submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in Information and Computer Sciences

by

Lynn S. Dombrowski

Dissertation Committee
Professor Gillian R. Hayes, Chair
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Abstract

Sociotechnical Food Justice:

Examining and Designing Public Interventions for Systemic Social Issues

By

Lynn S. Dombrowski

Doctor of Philosophy in Informatics

University of California, Irvine, 2015

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In this work, I examine and design public sociotechnical interventions for addressing food insecurity, a systemic social issue that describes a household's lack of enough food. Despite their efforts to alleviate symptoms of hunger and address underlying causes of food insecurity, government and nonprofit organizations in the US struggle to meet local food needs. My work explores these efforts, arguing that food inequality concerns social justice and interaction design.

I highlight three studies that focus on public sociotechnical interventions to address hunger. First, I examine how hunger-focused nonprofit organizations help their local community members access and use online government applications. Second, I describe a co-designed inter-organizational location-based information system for local nonprofits, which highlights the inter-organizational challenges when designing for collective action. Finally, I held participatory design workshops with

urban farmers, hunger-focused nonprofit organizations, and community members to address local

food needs. I examine how participants situate concepts of justice in their own practices and

experiences by analyzing the workshops' outcomes and process. I present insights that inform

design practice for social-justice oriented design projects. Collectively, this work contributes to

larger discussions within human-computer interaction on the strengths and limitations of

sociotechnical interventions in addressing systemic social issues.

Chapter 1: Introduction

Human computer interaction (HCI) invests in improving users' lives through technology design [Fallman, 2011]. Historically, the field focused on making technology easier to use [Gould & Lewis, 1985; Harrison, Sengers, & Tatar, 2011], and has made many contributions to augmenting individual, organization, and localized group practices [Olson & Olson, 2000; Hayes, 2011; Poole et al., 2011]. In recent years, HCI turned its attention towards addressing larger and more systemic social issues (*e.g.,* sustainability, health and wellness, and so on.), raising questions about how to design at such large scales, and how to intervene at the sociotechnical systems level [Baumer *et al.,* 2011]. By examining and designing public sociotechnical interventions[1] for large, systemic social issues, my work addresses this emerging inquiry in HCI.

In this research, I use hunger, a long-standing, pervasive social issue within the U.S. [Collins, 1996; Harrington, 1964], as a case study for examining and designing for systemic social issues. Many public interventions contend with hunger, and include technology at their core. For example,

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[1] While solution and intervention both refer to the different tools, services, and infrastructure employed to deal with hunger, I prefer the term intervention. A solution implies reducing complex social issues to a set of partial, incomplete conditions that can be addressed, and an intervention is different. Whereas, an intervention implies a longer-term relationship with the complex social and acknowledges that there may be no guarantor of success. By public, I refer to these technological systems that are situated in communities, local governments, and community-focused philanthropic organizations.

government nutrition programs often have online application components [Dombrowski *et al.,* 2012] and must internally process, track, and document applications [Voida *et al.*, 2014]. All of this technology supports government nutrition programs like the Supplement Nutrition Assistance Program (SNAP), Women, Infants, and Children (WIC), and so on. Likewise, hunger-focused nonprofits (*e.g.*, food banks, food pantries, soup kitchens, churches, and so on) use technology and information to support their efforts [Dombrowski *et al.*, 2012; 2014]. Unfortunately, despite these interventions, hunger persists as a systemic issue in the US [USDA, 2013A; FRAC, 2013]; while much needed, these existing interventions and their underlying approaches are inadequate. While people are interested in designing technology for social issues, often the problem is more complicated than technology designers take into account. Existing attempts tend to be either charity- or resource distribution-based. For example, governmental nutrition program WIC provides vouchers for specific types of food (*e.g.,* cheese, baby formula, peanut butter, eggs) to families with young mothers,[2] and hunger-focused nonprofit organizations, like food banks, typically redistribute donated food resources. Understanding hunger in terms of charity or resource access can be limited in terms of assessing and proposing methods of reasonable intervention to the problem and its multiple causes, because it tends to ignore power structures and cultural and political factors that contribute to the issue's persistence, severity, and scope.

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[2] http://www.fns.usda.gov/wic/women-infants-and-children-wic

I present a case for justice as an alternative way for design to contend with, take up, and understand systemic social issues. Many HCI projects orient towards issues and goals of justice, even if those projects do not explicitly label themselves as social justice projects. For example, participatory design [*e.g.,* Halskov & Hansen, 2015], philanthropic HCI [*e.g.,* Voida, 2014], and information and communication technologies for development (ICT4D) [*e.g.,* Toyama, 2010] domains align in different ways with the goals of justice. For example, citing ethical beliefs that those who will be impacted by systems should have a say in their design, participatory design expands who is able to make decisions within the design process; this ethical commitment is similar to social justice concerns of equitable representation. Similarly, ICT4D focuses on human welfare and development to expand technology and innovation's beneficiaries, which resonates with distributional justice concerns that stakeholders share the benefits and burdens of systems. Though often implicitly, HCI thus already engages with concepts of justice.

More *explicit* engagements with justice concepts will benefit our scholarship by bringing additional rigor and reflection to the strengths and limitations of designs capable of intervening in these complicated social issues. Justice is a useful alternative to charity-based initiatives for several reasons. At its heart, justice encourages examination of how designers are situated within power dynamics, including reflections on designers' own limitations to intervene in complicated issues. Additionally, taking up social justice as a position requires active reflection on designers' own beliefs and values: how their "vision of the world is a vision from somewhere" [Suchman, 2002]. Such examinations help designers develop awareness of their own situated politics. Second, justice enables focus on the cultural and political factors that contribute to social issues, moving beyond individuals to investigate how those larger factors impact experiences of inequality. Lastly, justice recognizes both systemic oppression as well as the capacities and limitations of the individual

agency of those who experience systemic social issues. Therefore, justice can be a productive way to examine and design for systemic social issues.

In this dissertation, I examine and design three public sociotechnical interventions for hunger and food insecurity. Allowing me to use the concept of justice to investigate the design and development process' multiple stages, these examinations take three distinct forms: a qualitative study of an existing e-government system, the design and prototyping of a potential new system, and the conduct of participatory design workshops.

In this dissertation, I use social justice concepts in two major ways. First, in Chapters 2, 4, 5, and 6, they shed light on the strengths and limitations of interventions within my own work as well as in related HCI literature. In these chapters, I analyze the field or my own prior work, looking at how the concepts of food and social justice shed new understanding. Then, in Chapter 6, justice also becomes a generative method, as I transform those concepts into design prompts, which help me examine how participants situated those concepts in their own practices and experiences through an analysis of the workshops' outcomes and process. Then, I analyze the data to produce key areas for a social justice-oriented design project that will promote designers' understanding and help them reflect on the strengths and limitations of their design choices. Therefore, as a theoretical concept, justice provides analytic and generative support within this dissertation.

I argue that although HCI already implicitly engages with concepts of justice, an *explicit* engagement can help us better understand the strengths and limitations of the design interventions we examine and produce. In particular, explicit engagement with justice in a design project clarifies three key points in the research endeavor. First, stakeholders open a dialog about equity in their projects, including a diversity of ideas and opinions on what in a given context constitutes justice. Second,

when rendered explicit, ideas about justice can be more deeply examined and thoughtfully reflected

upon, and any underlying conflicts can be confronted, and if need be, changed. For example, a

researcher may believe the best way to help people with hunger is to better distribute existing food

resources, whereas a person experiencing chronic food insecurity may rather generate new food

resources by planting a garden. Lastly, an explicit focus on justice represents an explicit ethical

commitment to the oppressed and marginalized. Given the severity of social inequality, such

explicit commitments are necessary to foster potential change.

My dissertation addresses three questions related to sociotechnical public interventions and

justice.

1) By examining how hunger-focused nonprofits support their local communities use of e-government systems, how can the mismatch between these systems' design and use inform our understandings of public sociotechnical interventions' limitations and capacities?

2) Given hunger-focused nonprofits' information goals, how might we design an inter-organizational location-based information system to promote collective organizational action?

3) What are the key design decisions that impact how participants situate concepts of justice in their own experience in a project, and what are the implications for design practice?

Each chapter of the dissertation examines one of these questions and produces insights for

understanding the capacities and limitations of public sociotechnical interventions. I articulate the

premise and contribution of the following chapters of this dissertation.

1.1 Dissertation Outline

I outline what each subsequent chapter discusses, argues, and contributes.

Chapter 2: Literature Review

My dissertation research sits at the intersection of social computing, critical reflective interaction

design, and social justice studies. Examining related works, I consider how justice concepts are defined and employed. This literature review highlights salient research regarding social and food justice about sociotechnical public intervention, and the ways in which justice provides an alternative design practice frame.

Chapter 3: Methods

Each method helps me understand different facets of sociotechnical interventions and their relationships to concepts of justice. I review each project and its associated methods. These methods include qualitative empirical methods (to examine current practices and build relationships) and critical reflective design methods (to explore the possibilities for action and change).

Chapter 4: Sociotechnical Practices of Public Interventions for Hunger

In this chapter, I examine the strengths and limitations of e-government systems for low-income populations by critically examining social justice issues such as distribution and access. Examining how hunger-focused nonprofit organizations help their local community members access and use online government applications, I establish that, although state-led technology initiatives hold the promise to create additional access to government programs, local nonprofits must provide considerable direct interpersonal and technical support. Given the vital role these nonprofit organizations play in their local communities, this chapter emphasizes the importance for design to take into account these broader supporting social relations, and not solely focus on individual community members.

Chapter 5: Designing for Collective Action Amongst Hunger-focused Nonprofits

I share findings from a research-through-design project, in which I co-designed an inter-

organizational location-based information system to help local nonprofits address shared information goals. Based on this study, my work shows that the inter-organizational politics of funding, visibility, and control must be taken into account when designing for collective action and reciprocity among hunger-focused non-profit organizations.

Chapter 6: Food Justice & Participatory Interaction Design

I held participatory design workshops to deal with local issues of food insecurity with urban farmers, hunger-focused nonprofit organizations, and community members. With these workshops, I introduce concepts of justice, and then, through an analysis of the workshops' outcomes and processes, examine how participants situated those concepts in their own practices and experiences. During my analysis, I produce the key design areas for a social justice-oriented design projects. I present three categories of key design decisions that impact how participants situate concepts of justice in their own experience. My work shows how participatory design practice can be tailored to support and explicitly consider concepts of justice. By drawing attention to these key design decisions, designers can better engage with social justice projects at the level of sociotechnical systems and large scale social problems, as well as with their implicit assumptions about justice.

Chapter 7: Conclusion

Through these three studies, I use theoretical concepts of justice to examine and design for public sociotechnical interventions for social issues, and to explicate the limitations and strengths of these interventions. This chapter concludes with broad implications for understanding the relationships between sociotechnical public interventions and justice.

Chapter 2: Background and Literature Review

My dissertation research intersects social computing, critical reflective interaction design, and social justice studies. In examining related works within HCI scholarship, I consider the relationship between sociotechnical interventions for systemic social issues and concepts of justice. First, I provide a high-level account of hunger in the US, a systemic social issue. Second, I examine the concept of justice as understood by social and food justice literature, and how those concepts relate to HCI. Third, I review and make the case for how HCI already implicitly engages in justice within its activist and interventionist projects.

2.1 Overview of Hunger, or Food Insecurity, within the US

Hunger's negative consequences in the US are far-reaching, and disproportionately impact women, children, the elderly, lower socioeconomic status individuals, and people of color [Cunnyngham *et al.*, 2013]. In 2012, nearly 50 million people in the US experienced some form of food insecurity, inversely following economic trends (*i.e.*, individuals with less money tended to have higher incidents of food insecurity) [USDA, 2013A; FRAC, 2013]. The USDA defines food insecurity as "… a lack of access to enough food for an active, healthy life for all household members" [USDA, 2013A]. Likewise, hunger is "an individual-level physiological condition that may result from food insecurity" [USDA, 2012B]. Food insecurity can occur with or without the state of hunger, as individuals can lack the physiological symptoms associated with hunger, but still lack adequate access to food for a healthy household [USDA, 2012B].

Governments and hunger-focused nonprofit organizations comprise a network of services and programs for individuals dealing with food insecurity. The United States government hosts nutrition programs to address hunger's negative consequences (*e.g.*, CalFresh or Food Stamps; Women, Infants, and Children; Child and Adult Care Food Program; etc.), but in California these programs are underutilized. For several years, California has had the lowest participation rate of eligible individuals in the nation for their state's nutrition program (with 44% enrolled in CalFresh, compared to the US national average of 66%) [Cunnyngham *et al.*, 2010; Nord *et al.*, 2008; Cunnyngham *et al.,* 2013]. Higher participation rates not only alleviate hunger for those in need, but also improve local food quality [Kantor, 2001] and provide a boost for the local economy [Zandi, 2012]. While these programs' low participation may seem perplexing, scholars examining the nonuse of social service programs cite multiple reasons, including the impact on moral and social capital [Sherman, 2009], self-judgment [Ellwood, 1989], judgment of others who receive services [Ellwood, 1989; Sherman, 2009], and knowledge (including lack thereof) regarding access and availability [Zedlewski & Gruber, 2004].

Diverse hunger-focused nonprofit organizations work together to support nutrition and hunger initiatives in their local neighborhoods, including food banks, soup kitchens, neighborhood-oriented nonprofits, online-only nonprofits, and so on. They provide direct community-level support programs to address gaps in the local food systems, including nutrition classes, food pantries, food distributions, and other forms of assistance, such as application assistance for government programs. To decrease nutrition-related health concerns, these nonprofits are concerned with delivering not only a large quantity, but also a high quality, of food [Mazon, 2013]. Unfortunately, the need and demand for food assistance has increased, while the resources needed to provide assistance have simultaneously reduced [Cohen, Mabil, Potter, & Zhao, 2010; Bosman,

2009; Warshawsky, 2010; Zezim, 2007; Johnson et al., 2014; Resnikoff, 2014]. Despite all these impressive forms of assistance, nonprofits are often not able to meet all their communities' and clients' needs. For example, Tarasuk & Eakin report that nonprofits often must restrict the quantity of food given to clients [Tarasuk & Eakin, 2003], mirroring my own field site participant's practices [Dombrowski et al., 2013].

My dissertation seeks to use technology to help hunger-focused nonprofits achieve their goals of assisting local communities with food insecurity issues. For more than a decade, the two states where I conducted my research, California (15.6%) and Georgia (16.9%), have experienced higher food insecurity rates than the U.S. national average (14.6%) [Colman-Jensen *et al.*, 2013]. Given these higher rates, these two states are compelling sites to examine public interventions, since there appears to be a greater mismatch between the needs of the food insecure, and offered interventions.

2.2 Social Justice as Food Justice

This section briefly outlines different conceptualizations of social justice and its subdomain of food justice to demonstrate these notions' implication in the design process. It is beyond the scope of this dissertation to examine the several millennia worth of western thought on the concept of justice (*e.g.*, Plato, Aristotle, Augustine, Aquinas, Hobbes, Hume, Kant, Mill, and so on); therefore, I briefly survey more contemporary works (*i.e.*, since the 1970s), and those issues relation to design. Readers should not that I occasionally shorten the term "social justice" to "justice."

At its core, justice focuses on the obligations created through our interactions with each other. There are many different types of justice, and no single, agreed-upon definition, nor a consensus on how to work towards it, or to verify its achievement.

Social Justice

Social justice defined: From a Western perspective, justice refers to the concept that everyone receives his or her due and the "… moral obligations concerning matters and events that humans have control over" [Lötter, 2011: 181], thereby confining justice to controllable events. Rawls, a philosopher, defines two basic principles of justice: "the first requires equality in the assignment of basic rights and duties, while the second holds that social and economic inequalities, for example inequalities of wealth and authority, are just only if they result in compensating benefits for everyone, and in particular for the least advantaged members of society" [Rawls, 1971].

Lötter argues that we can understand justice's obligations by examining three factors. First, people are owed restitution if the consequences of another's actions impact their lives. Second, interacting or participating in events institutes obligations to each other (*e.g.,* mutual respect, respecting property, etc.). Lastly, decision-making, in which individuals are "…subject to the decisions of some or other authority," also creates justice obligations. Based on major western justice theory since the 1970s, Lötter additionally provides a framework for understanding the different types of issues within the contemporary concepts of justice: recognition, reciprocity, enablement, distribution, accountability, and transformation [Lötter, 2011]. This research explores how Lötter's framework could help structure and inform discussions on the concepts of social justice during the design process. I briefly describe each of Lötter's concepts of justice in order to introduce the fundamental

concepts. In this dissertation, I demonstrate how these concepts relate to concerns within the HCI and interaction design domain.

Justice as Recognition: Recognition is the identification of unjust phenomena, and "… identifying [the] members … who are owed justice of the kind under discussion" [Lötter, 2011], including those indirectly impacted, and the consideration of the impact's degree and severity.

Justice as Reciprocity: Building on recognition, reciprocity describes how to implicitly or explicitly agree on the level of cooperation between who is owed and who owes, which requires definitions of the "relationship[s], specif[ic] duties, and responsibilities, and … [the] benefits and advantages" of the phenomenon under discussion [Lötter, 2011].

Justice as Enablement: Enablement comprises the opportunity people need to fulfill their potential and to develop their capacity. "[I]nstitutions, laws, policies, and human behavior [both] enable or constrain [individuals'] self-development and self-determination" [Lötter, 2011]. Individuals and societies can only have access to such opportunities if they have the required prerequisite access to "social goods [such as] as education, health care, and nutrition" [Little, 2003].

Justice as Distribution: Distribution is the "equitable distribution of goods that can be distributed like and analogously to, material possessions" [Lötter, 2011]. This refers to the allotment of both material and nonmaterial benefits (*e.g.*, wealth, goods, and privileges) and burdens (*e.g.*, lack of resources, environmental pollution, etc.).

Justice as Accountability: Accountability describes "… how to assign responsibilities and to find appropriate sanctions, penalties or punishment for those persons who violate society's accepted

principles of justice" [Lötter, 2011]. Here, responsibility refers to situations in which an individual had control and influence over an outcome [Lötter, 2011; Suchman, 2006].

Justice as Transformation: Over time, the concepts of justice are fluid, since, "conceptions of justice change over time [to reflect new social norms] and therefore just ways and means must be found to comply with a new, improved conception of justice" [Lötter, 2011]. Similar to ideas of justice as enablement, justice as transformation seeks to create platforms whereby individuals self-govern and determine. However, it focuses on the roles "institutions, practice, and behavior" [Lötter, 2011] have played in historical injustices, and how to change them such that individuals may be better positioned to self-determine.

Design and Justice

In the preceding section, I reviewed Lötter's major concepts of justice. In what follows, I articulate how design theory within HCI and related design disciplines addresses these concepts, highlighting how social justice and design are natural allies given their mutual commitments to change.

Design Practice and Concepts of Justice: This section demonstrates how theories of design implicitly and explicitly engage with concepts of justice. Design is often conceived as an ongoing conversation with a situation and the materials at hand. These dialogs enable designers to contend with issues at hand, but also unavoidably create tensions and contradictions when contending with matters of concern [Binder *et al.*, 2011]. In social justice projects, design contends with different temporal scales (*e.g.*, the future, the past, the present) that designers attend to in their process. Each scale provides different types of insight into how we might understand the interplay between justice and design. Although these time scales tend to be bound together in design practices, it can be useful to think about them as separate eras and/or time scales.

When considering the present, design can be seen as a way to engage with the materials and resources at hand (*e.g.*, social or physical resources, and so on) in a reflective ongoing dialog with a situation [Schön, 1983] to work towards preferred outcomes. In particular, equity-oriented work within HCI scholarship highlights the importance of attending to social relationships when preparing for design work, as continued partnerships unfold, and as machines and people are reconfigured by the other [Irani & Silberman, 2013; Suchman, 2006].

Given its concern with "preferred outcomes," design can be understood as a future-orienting activity that tries to understand the current situation and its possible futures. Design is concerned with "changing reality rather than simply describing it or maintaining it" [Dunne & Raby, 2013] as well as examining "the present [] to discuss the kind of future people want" [Dunne & Raby, 2013]. Key to the debates about justice are what constitutes "preferred" and to whom; therefore, the design process requires discussing what is a preferred situation, for whom is it preferred, barriers or problems that preclude that preferred state, and articulations of plans to that future, which requires an ongoing reflexive dialogue among the design materials, the analysis of problems, and their synthesized solutions [Fallman, 2003; Schön, 1983; Nelson & Stolterman, 2003].

Lastly, part of justice's work is to understand how the current conditions arose that perpetuate injustices. A historical perspective provides insight into how current situations came to be, and how they might be made more malleable. Margolin, a design historian and theorist, states that "history can function as an instrument of human liberation by offering us a vantage point outside the prevailing values of society" [Margolin, 2002]. Conversations with the past allow us to contend with "complexities and contradictions of the social world" [Margolin, 2002] to better understand how things came to be, and therefore how they might be different. Unfortunately, design and

engineering projects tend to lack critical historical perspectives. As a result, projects may only serve

to treat inequality's symptoms [Li, 2007; Ferguson, 1994; Mitchell, 2002].

While design and social justice are natural allies due to their shared commitments to change, using

concepts of social justice to reflect on and inform design practice enables the critical engagement

necessary to identify and work towards preferred outcomes. Design is not limitless in its capacity

for change (*e.g.*, Li, 2007), and one of this project's goals is to explore the limitations of design's

capacity within social justice projects. Next, I articulate how the aforementioned issues of justice

relate to the process of design, including the problem space and design outcomes.

Design as Recognition: The concept of recognition applies to design in several ways. Within design

practice, recognition justice can be understood as the process of articulating the collection of issues

at hand [DiSalvo *et al.*, 2011] and problem framing [Schön, 1983]. Schön defines problem setting as:

"the process by which we define the decisions to be made, the ends to be achieved, the means which maybe may be chosen. In real-world practice, problems do not present themes to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain. … Problem setting is a process in which, interactively, we name the things to which we will attend and frame the context in which we will attend to them. … Through the non-technical process of framing the problematic situation that we may organize and clarify both the ends to be achieved and the possible means of achieving them" [Schön, 1983 p. 40-41].

Similarly, Kolko articulates the ways in which problem frame is a useful subjective construction for

designers, as it is "a point of view…a non-objective way of considering a situation or idea. But a

frame…is of critical use to the designer, as it is something that is shaped over the long-term

aggregation of thoughts and experiences…and is therefore a larger way of viewing the world and

situations that occur in it" [Kolko, 2010]. The cultivation and development of these problem frames

and insight requires creating relationships that allow for in-depth examination of particular

situations. Problems do *not* exist *a priori*. Designers create problems when they define and

articulate the collection of issues comprising the problem. The act of defining a problem simultaneously creates the acceptable parameters by which they can be addressed (*i.e.*, solutions that contend with the problem) by narrowing the focus of the potential design solutions. To co-define problems with participants and thereby facilitate richer understandings of the problems at hand, designers need to understand the *particulars* of lived situations, which necessitates longer-term engagements with particular people (*i.e.*, participants). Lastly, recognition justice also entails that we create open, transparent, and inclusive decision-making processes about which knowledge matters when framing a problem [Eubanks, 2011].

Design as Reciprocity: Reciprocity justice is the agreement on participation levels between parties. Applying reciprocity justice to design practice requires design procedures to be transparent and open for contestation between parties while they work towards agreement on the definition of the issues and how they might be addressed. Such sentiments align with the democratization of technology, both in terms of access to information as platforms for action and the production of information technology [*e.g.*, Le Dantec *et al.*, 2010; Binder *et al.*, 2011]. Participation from a broad audience more robustly informs design outcomes and processes that can enable platforms for equitable engagement with societal challenges.

Design as Enablement: For design practice, enablement justice describes how we foster human capacity by creating participation and self-determination platforms. In terms of design, practice should not seek to standardize, but rather to enable individuals to reflect and decide what is best for themselves, while avoiding undue negative impact on others. Although enablement justice as a design quality may appear clear, several challenges complicate its operationalization in design artifacts. For one, although a group may agree on the problem, they may vehemently disagree on its

solution. Design is often valorized as a vehicle for action and change; however, design stakeholders must first contemplate and envision different potential futures that could exist, and how to work towards them. New technology design is an ongoing conversation between the existing and imagined, which necessitates articulating the middle steps needed to achieve the preferred imagined ideal. Reflection on the types of futures we seek to create, and how we position different stakeholders and the particulars of the existing situations, creates a platform where tempered visions of possible change can occur. Within these tempered visions of the future and the possible, enablement can be seen as a successive iteration working towards ideals. Further, while working towards consensus is important, as noted by other works [*e.g.*, Le Dantec, 2012; Le Dantec *et al.*, 2010, DiSalvo, *et al.*, 2010], consensus alone will not guarantee a preferred outcome.

Design as Distribution: Distributive justice refers to material and nonmaterial benefits and burdens allocation. In terms of technology design, distributive justice could be understood in several ways. First, there is the distribution of access to information and technology and their underlying infrastructures (*e.g.*, the internet). The lack of access to such material entities is typically referred to as the "digital divide," or the disparity between individuals who engage with technology and those who do not [Norris, 2001; Bruno *et al.*, 2011; Nam & Sayogo, 2011]. However, technological and informational access is a limited metaphor for distributive justice, since individuals need technical skills to use technologies, as well as the ability to recognize what kinds of information can address problems [Mossenburg *et al.,* 2003; Belanger & Carter, 2006].

Second, a more robust definition of distributive justice encapsulates not only technology's material goods and resources, but also redistribution of its production mechanisms. Feenberg argues, "the unequal distribution of social influence over technological design contributes to social *in*justice"

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[Feenberg, 1995]. Work within HCI seeks to broaden the scope of those who are able to participate in the production of technology (*e.g.*, participatory design; action research; cooperative design) by focusing on disenfranchised populations (*e.g.*, [Le Dantec *et al.*, 2010]). By incorporating typically excluded people into the design process, we may render visible alternative technological design spaces that may be more consistent with participants' particular cultural practices and preferences [Feenberg, 1995].

Design as Accountability: Accountability justice assigns sanctions for those that have violated a sense of justice. Individuals can only be held accountable if an outcome was under their influence of control. Given that, one way to consider accountability in relation to design would be to design technologies to help render individuals and their actions more accountable to those impacted by them. For example, one could imagine technologies that demonstrate who an elected official's voting patterns negatively impact.

Suchman identifies three contrasting positions for understanding the relationships that are created through technical systems' design and use: the view from nowhere, detached intimacy, and located accountability. She advocates for the position of located accountability, which helps designers understand how their "our vision of the world is a vision from somewhere ... which makes us personally responsible for it." Such a view of design and accountability helps designers understand how accountability can play a role in the relations of design, production, and use of technological systems. This could help designers be self-accountable to other stakeholders who may be impacted by their design decisions, ranging from the inclusion criteria for direct stakeholders, to contemplating the types of materials used to produce the final design.

Design as Transformation: Transformation justice focuses on the role structural inequality (*e.g.*, government institutions, the cultural milieu, access to education, etc.) may play in perpetuating social injustices. Large social problems, such as food insecurity, develop from multifaceted interactions between individuals, organizations, governments, and so on. Recent work within HCI, notably sustainable HCI, recognizes individual actions' limited effect on large social problems, and has called for further understanding of problems beyond the individual (*e.g.*, [Brynjarsdóttir *et al*., 2012; Dourish, 2007, Dourish, 2010; Knowles *et al*., 2013]). Such work asks designers to consider the "political and cultural context" [Dourish, 2010] so they might develop effective solutions to large-scale societal problems. This broadening of the design space promotes designers to move beyond individual action and towards designing for collective action, by focusing on regional and national contexts [*e.g.*, Foth *et al*., 2009; Goodman, 2009]; activist groups [*e.g.*, Goodman, 2009; Paulos *et al*., 2008; DiSalvo *et al*., 2010; Parker *et al.*, 2012], and/or nonprofit organizations [*e.g.*, Le Dantec et al., 2010; Woelfer & Hendry, 2009].

In summary, issues of design and social justice are natural allies due to their commitments to understand preferred situations and seek out ways to implement social change. Further, reading theories of justice could inform design practice by prompting self-reflection on the design process and how problems are understood and negotiated.

Food Justice

This section defines key terms for understanding debates within food justice; in particular, *food access* and *food sovereignty* as two key forms.

Focus on Food Access: Within food justice scholarship, some authors define food justice in terms of access. For example, Gottlieb and Joshi define food justice as that which "ensure[s] that the

benefits and risks of where, what, and how food is grown and produced, transported and distributed, and access[ed] and eaten are shared fairly" [Gottlieb and Joshi, 2013]. Similarly, the nonprofit Just Food (2010) defines food justice as "communities exercising their right to grow, sell, and eat [food that is] fresh, nutritious, affordable, culturally appropriate, and grown locally with care for the well-being of the land, workers, and animals" [Just Food, 2010 via Alkon and Agymen, 2011]. Food access focuses on enabling people to produce and consume food that is fresh, affordable, and equitable in their local food system.

Focus on Food Sovereignty: Other food justice scholars define food justice not only in terms of food access, but also encompass the concept of food sovereignty. While food access concerns communities and their "... ability to produce and consume healthy foods" [Alkon and Agymen, 2011], food sovereignty is seen as a form of procedural justice, "... which encompasses the rights of all affected communities to be included in ... decision making" process in matters related to food [Alkon and Agymen, 2011 citing Flecter, 2004; Shrader-Frechette, 2002]. As such, "... food sovereignty moves beyond the distribution of benefits and burdens to call for a greater distribution of power in the management of food and environmental systems" [Alkon and Agymen, 2011]. Issues of food justice as food sovereignty shift the focus from the distribution of material goods, to a focus on concerns of control, participation, and decision-making within food systems.

The Limits of Justice as Material Redistribution: Both redistributive and procedural justice paradigms can be problematic in ways that should be considered when thinking through the design process for social justice endeavors. First, although the distribution of material goods is an essential component of achieving equity, it is not adequate for dealing with inequalities that are not distributional or material in nature (*e.g.*, rights to recognition and representation; participation and

control in the mechanisms of production or decision-making in food systems). Eubanks argues, "the distributive paradigm, with its focus on equity as remedying perceived citizen deficits, is a weak foundation on which to build a less oppressive, less exploitative technological present;" Eubanks instead argues for developing technology based on "resisting oppression, acknowledging differences as a resource, and fostering democratic and participatory decision making" [Eubanks, 2011].

One way to contend with the shortcomings of framing justice as material redistribution is to focus on justice as decision-making and sovereignty, which moves toward achieving equity through the inclusion of multiple voices in the design process and in knowledge production. While incorporating multiple voices into the design process also introduces difficulties such as contending with the controversies among participants as individuals work towards alignment through designed artifacts [Binder *et al.*, 2011], this is seen as a valuable process. Including people in the decision-making process who are impacted by the decisions made is another important step in working towards justice, but issues of participation and decision-making must still be unpacked and examined while working toward equity.

However, notions of democracy can be problematic and contested and therefore the calls for democratizing the production of technology need to be critically reflected on [*e.g.*, Cruikshank, 1999; DiSalvo, 2012]. Democratizing technology's mechanisms of production can "enroll people into the process of their own domination" [Eubanks, 2011 148]. Furthermore, democracy in action is not always about finding common ground and equalizing control, but also about leaving open spaces for contestation and ongoing debate [DiSalvo, 2012]. This implies that a justice-oriented

design process cannot only concern itself with the design process, but should also focus on how that process influences the proposed outcomes and types of systems designed and developed.

2.3 Social Justice within HCI

Numerous projects in HCI orient towards social justice issues, even if these projects do not explicitly label themselves as such. Within HCI, concepts of justice not only manifest in technological outcomes, but also influence various design processes (*e.g.*, participatory design; action research; cooperative design). I argue that HCI already, often implicitly, engages with concepts of justice, as evidenced by HCI projects concerned with design for activism, social movements, nonprofits, and the domain of Information and Communication Technologies for Development (ICT4D). In this section, I examine the literature of nonprofit work within HCI and ICT4D to highlight the ways in which notions of social justice are implicit within these studies, and I relate these literatures to my work.

Designing with Nonprofits in HCI

One area where HCI increasingly examines issues related to social justice is in work with nonprofit organizations. Nonprofit organizations that HCI research focuses on typically find practical ways to address complex social issues [*e.g.*, Woelfer & Hendry, 2011; Le Dantec *et al.*, 2010; Dimond *et al.*, 2013]. HCI research often seeks to amplify nonprofits' effectiveness through the design of novel systems: thus, this research is implicated in addressing issues related to social need. When designing for nonprofit organizations, HCI has learned that nonprofit organizations face key technology challenges that are distinct from larger for-profit enterprises. Predominately, these organizations work in low-resource settings (*e.g.*, [Le Dantec & Edwards, 2008; Voida, Harmon, Al-

Ani, 2011]). This situation is often referred to as the "organizational divide," a term that suggests there are disparities between organizations that can and cannot use technology to further their mission [Kirschenbaum & Kunamneni, 2002; Kvasny & Lee, 2011; Schneider, 2003]. Limited ability to productively engage with technological resources hinders organizations' capacity to collaborate in service of a shared mission [Stoll, Edwards, & Foot, 2012]. This literature also highlights the volunteer workforce's volatile nature. The technical skills and expertise within a particular organization's volunteer workforce constantly shift, thus creating the need for continual retraining [Voida, Harmon, & Al-Ani, 2012; Woelfer & Hendry, 2009].

Nonprofit organizations that address pressing social needs often directly serve vulnerable, marginalized populations, such as the homeless and victims of domestic violence, and often work in constrained environments [Dimond, Fiesler, & Bruckman, 2011, Le Dantec, 2012, Roberson and Nardi, 2010; Stoll, Edwards, & Mynatt, 2010; Woelfer & Hendry, 2011]. Typically, interaction design in these spaces seeks to amplify these service providers' efforts, while balancing the needs of the nonprofit organization and its clients (*e.g.,* [Le Dantec, 2012; Woelfer & Hendry, 2011; Dombrowski *et al.*, 2013]). Nonprofit design work has also focused on creating new kinds of possible interactions that resist oppression through active forms of activism (as opposed to passive forms of activism known as "slacktivism" [*e.g.,* Rotman *et al.*, 2011; Morozov, 2009]). For example, Dimond takes an activist and participatory action research approach to designing with a nonprofit organization that seeks to end the street harassment of women [Dimond *et al.*, 2011; Dimond *et al.*, 2013], using a platform for sharing stories and identifying harassers. Interaction designers have also focused on the more mundane, but necessary, daily aspects of nonprofit work, such as facilitating donations, information management, etc. [*e.g.*, Nathanson *et al.*, 2009; Merkel *et al.,* 2007].

HCI orientation towards social justice (as manifest through its work with nonprofits) appears to be mostly practical, or non-disruptive, in nature. As noted above, many of these HCI design projects seek to amplify these nonprofits' existing works, and thus indirectly support issues related to social justice. Literature that advocates that HCI should turn an analytical gaze to their own practices [*e.g.*, reflective HCI [Sengers *et al.*, 2005; Lowgren & Stolterman, 2004], critical HCI [Bardzell, Bardzell, Forlizzi, Zimmerman, & Antantis, 2012; Bardzell & Bardzell, 2013], activist HCI [Hayes, 2011; Irani *et al.*, 2010], third-paradigm HCI [Harrison, Sengers, & Tarter, 2011] etc.], suggests that scholars should critically reflect on the practices their work seeks to amplify, and the ways in which a larger cultural and political milieu situates those practices. My research falls within this call.

For example, amplifying existing nonprofits' current practices may not be the most effective way to address justice issues around hunger. Literature in this space suggests that hunger-focused nonprofit organizations often develop programs that orientate towards their clients with the charity model, which can be a troublesome underlying ethic. Scholars who study hunger-focused nonprofits suggest that some of the food programs these hunger-focused nonprofits develop may be culturally inappropriate [Guthman, 2008], provide insufficient amount of resources [Lake & Newman, 2002; Poppendieck, 1998], be nutritionally inadequate [Poppendieck, 1998], inaccessible to those in need [Riches, 2002; Poppendieck, 1998; Lake & Newman, 2002], and inefficient [Riches, 2002; Poppendieck, 1998]. If an emergency food program does not address the underlying issue of why a person might need assistance, they are referred to as "stop-gap" measures, which could create barriers to more sufficient programs [Poppendieck, 1998]. These scholars caution that these "stop gap" measures may "undermine the state's obligation…to respect, protect, and fulfill the human right to food" [Riches, 2002] because "charity food" offers a "moral safety valve" [Poppendieck, 1998] without providing "adequate public provision" [*Ibid.*]. Collectively, this work

suggests that, when forming partnerships, designers and researchers must be critical of types of practices and services they wish to amplify, and not be complacent about how the practices we seek to amplify are situated within a larger cultural and political milieu and historical trajectory when conducting our own design work towards equity.

Further, the work of Poppendieck, Riches, Guthman, and Lake & Newman suggests that although different organizations working in these spaces may agree on an overarching issue (e.g., food access) in their interests, goals, and agendas, they do not always agree on how to best approach local food challenges. Therefore, the design process must deal with conflicts that arise during the process and are motivated by "a diversity of perspectives, concerns, and interests" [Binder *et al.*, 2011] that need to be worked through to find common ground.

ICT4D

Another area in which HCI undertakes social justice projects is ICT4D, which is research concerned with how novel and existing technologies can be productively used in developing regions. Many of these design projects focus on providing material goods and information (*e.g.*, access to water, information, and other necessary resources). In particular, access to technology and information, through novel systems and interactions, or by compensating for different forms of literacy, etc., is still a top concern amongst ICT4D scholars and researchers [Patra, Pal, & Nedevschi, 2009].

Within the context of ICT4D, many projects work towards improving access to information through technology and human intermediaries. New technology applications promote Internet access in previously unconnected spaces. For example, telecenters (also known as PC Kiosks or village knowledge centers) "exist primarily to provide the general public access to computing and/or the Internet with the explicit intent to serve a developmental purpose" [Toyama & Keniston, 2008].

Additionally, the design and development of novel wireless technologies create new ways to access the Internet in previously unconnected rural areas [Ben-David, 2006; Patra *et al*., 2007; Raman & Chebrolu, 2007]. Lastly, many lower-income individuals tend to use mobile devices to connect to the Internet [*e.g.*, Brenner, 2012; Zickuhr & Smith, 2012].

Related research has explored designing for access challenges under a variety of less-than-ideal circumstances. For example, in developing contexts, designing to stave off unstable Internet connectivity increases the technological resiliency and adaptability of information and communication systems [*e.g.*, Tucker & Blake, 2008]. Such design choices greatly increase the scope of places where accessing the Internet is possible. In another example, research examining how people navigate breakdowns during periods of sustained disruptions [*e.g.,* Semann & Mark, 2011; Mark *et al*., 2009] recommends designing for flexibility and improvisation within sociotechnical arrangements, as well as creating multiple, redundant systems so that less technically-savvy individuals are not left behind. Similarly, another strategy for expanding the access and utility of technology examines technology's intermediated usage (*e.g.*, Parikh & Ghosh, 2006; Sambasivan *et al.*, 2010, Sukumaran *et al*, 2009; Oreglia *et al*, 2011; Toyama, 2010; Bailur, 2010), whereby different people are necessary for supporting access to and use of technology and the Internet. This strain of research examines how moving beyond the single user-single device paradigm may stretch the reach of technology in places where it is scarce.

In addition to concerns about access to and redistribution of resources, ITC4D works toward the democratization of technology's production (*e.g.*, Le Dantec, 2012, Stillman, 2013). Many of these design projects develop technologies that resist forms of oppression, such as sexism, classism, or racism (*e.g.*, Dimond *et al.,* 2011; Dimond *et al.,* 2013; Pritchard & Vines, 2013).

While much of the work within ICT4D is framed in terms of redistributing resources and ensuring access to information, my work aims to explore how alternative framings to redistribution may be productive in the design process.

Chapter 3: Methods

In this four-phase research, I adopt several qualitative and design methods to better understand design, technology, and public interventions.

In the first-phase qualitative exploratory study, I conducted interviews, contextual inquiry, and participation observation through volunteering. This work enabled me to understand the practices and relationships amongst key stakeholders within the hunger-focused nonprofit organizations and nutrition services government agencies. I used several empirical qualitative research activities to inform my understanding of the mundane daily working practices, goals, and constraints of hunger-focused nonprofit organizations. First, I observed and participated in food access inter-organizational meetings that focused on identifying common goals, building relationships between organizations, sharing resources, and deepening understanding of food system issues. Second, I interviewed and observed e-Government intermediaries working for nonprofit organizations assisting local individuals' access to and use of federal nutrition programs. Third, I interviewed social service workers about how implementing a new e-Government system impacted their relationship with their customers and their work. This set of empirical work provides me with a particular sensibility and orientation useful for thinking through justice issues while designing alongside nonprofit organizations (*e.g.*, working conditions, constraints, resources, goals, understanding possibility). As such, my empirical work informs my design work. During the fourth phase, I examine all of my studies together to produce coherent themes in my work.

Next, during my second research phase, I build off of the knowledge and relationships that I developed during the first phase to design, prototype, and evaluate a collaborative location-based

information system for collective action amongst hunger-focused nonprofits. I designed this system to help nonprofit organizations match local food needs and help distribute those resources.

In the third phase, I co-hosted and designed participatory workshops, enabling me to examine, through analysis of those workshops' outcomes and process, how participants situated those concepts in their own experiences and practice. This dissertation results from these research activities. By interweaving different qualitative empirical and design methods and approaches to the food access-focused organizational context, I aim to gain insight into the interplay between the sociotechnical landscapes and their community-oriented practices and goals. By focusing on this interplay, I am able to identify people's goals as well as their methods of execution. This allows for a practical, mundane understanding of justice in practice, rather than an idealized version. In later chapters, I demonstrate how these insights may inform design practice.

Finally, I conclude this research project by inductively analyzing data collected from all of the studies described here. In what follows, I discuss each research phase in turn.

3.1 Phase 1: Exploring the Sociotechnical Practices of Public Interventions for Hunger

In this research, I use multiple qualitative methods—including direct observation, participant observation, shadowing, and formal and informal interviewing—to understand the work practices and technology use of different organizational workers within the food and hunger assistive service ecology in one southern California county.

While conducting the qualitative portion of this research, I worked with a wide spectrum of individuals connected to the food and hunger assistive service ecology, including both local

nonprofit and public sector organizations. These organizations included two food banks, two organizations assisting with food-specific programs for vulnerable populations, one religiously-affiliated organization, one bridging organization, and a social service agency. These organizations were all located within the same largely urban and suburban county.

In the nonprofit sector from 2011 until 2014, I conducted 32 interviews and over 50 observation hours. Interviews included questions about daily practice, technology use, and interactions with other workers, clients, and other nonprofits. My observations focused on the daily work practices of individuals working in these organizations; I followed staff and took notes on their practices, interactions with clients, etc. These direct observations allowed me to gain access to much of the social setting of their work, and build relationships and rapport with participants. Post-observation, I would often request clarification interviews to add additional insight to my observations, which created additional insight into observed phenomena. I also attended, observed, and participated in 10 inter-organizational meetings, taking detailed notes of approximately 20 meeting hours. These meetings focused on discussing food-related issues and problems, finding new ways to collaborate amongst the organizations, educating each other on topics around food security, and developing new methods to help local communities. This participant observation gave insight and context into food access endeavors and issues beyond a single organization. Additionally, I built rapport with different members of this nonprofit ecology.

Within the public sector, I conducted 12 interviews with social services staff, managers, and administrators on the process and administration of a government nutrition assistance program's online application. I conducted the first interview with a social services administrator in May, 2011. This interview provided a high-level orientation to the social services and their deployment of the

e-Government system. This interview allowed me to build the rapport necessary to gain entry for the additional interviews. Over the course of three days in January, 2012, I interviewed 11 additional staff members, including managers, supervisors, and eligibility technicians. These interviews focused on their daily work practices, their relationship with staff and clients, challenges working with the new systems, changes in practice and relationships due to the new system, and their recommendations for e-Government system modifications. Due to client data regulation, I was unable to tour workspaces or observe work practices.

All interviews were audio recorded and transcribed.

Such empirical work enables me to understand these nonprofit organizations' motivations, daily practices, constraints, and resources, while forming relationships with them. Such work grounds my design insights for what is possible and practical within a particular design space. Further, I can understand and situate how they translate some of their equity-orientated motivations and programs into practice.

I regularly met with my advisors and Amy Voida to discuss trends in the observation and interview data. Dominant topics discussed included the outreach workers' work practices, and their role in facilitating the online application process for their clients. I conducted inductive analysis of my field notes and interview transcripts using memoing, coding, and affinity diagramming. The initial codes typically related to the outreach worker's role supporting client access to the service and technology, and the ways in which the online application was implicated in the outreach workers' ability to serve their clients. Subsequent iterations of the coding scheme helped to differentiate the types of assistance the outreach workers provided their clients as they engaged with the service.

3.2 Phase 2: Supporting Collaborations Amongst Hunger-focused Nonprofits

Based on my prior qualitative exploratory work, in this study I investigate how we might design to support collaborations amongst hunger-focused nonprofit organizations. I use insights gathered from my qualitative empirical phase to understand the challenges and opportunities facing organizations that serve food insecure people. During my qualitative field study, I began a cooperative design and evaluation phase focused on creating a location-based information system. Finally, I conducted an additional interview study to validate and refine my design considerations.

Concurrently with the qualitative field study, I engaged in cooperative design sessions to understand how particular technologies might meet these organizations' information goals. Working closely with three key participants from two organizations, I co-sketched a variety of potential design concepts to understand how particular technologies might work within their organizations. These sessions added nuance to my thinking on how organizations work together to assist their local communities. The result of these cooperative design sessions include sketches and a functional prototype. When working with low-resourced populations and organizations with limited exposure to ubicomp systems, it can be helpful to conduct interviews with a functional prototype in hand. I thus conducted seven additional interviews with hunger-based nonprofit workers from five different organizations. During the interviews, I used our prototype and sketches to solicit feedback on the design concepts and to further refine both our overall design considerations and specific prototype.

During these interviews, I engaged in concept validation by requesting feedback on potential mapping application designs to investigate how such technologies might play a role in their work and their relationships with other organizations. I tailored feedback requests depending on the

worker's role. Evaluating the prototype across multiple types of workers and organizations helped me gain insight into how the system might affect inter-organizational politics.

For this phase, I conducted analysis with a team of undergraduate and graduate researchers to discuss the system's design and evaluation data trends. Dominant topics discussed included the system's functionality, new functionality, the design's limitations, and how the design would impact various stakeholders. I conducted inductive analysis of my field notes and interview transcripts using memoing, coding, and affinity diagramming. The initial codes typically related to the organization's type or role, and how a particular functionality may impact the relationships between organizations.

3.3 Phase 3: Food Justice & Interaction Design

There are several points I would like to make about my design approach. First, participatory design aligns well with this work since it assumes that, to increase the likelihood of effective design outcomes, those who will be impacted by a design should have influence over it [Carroll & Rosson, 2007]. Second, this work does not take up efficiency and usability of systems (early, but still ongoing concerns of HCI) as primary concerns, but rather particularly understands that values, in this case justice, can influence the design process. Lastly, within this project, a value is not a singular concept, but rather has multiple variations and arrangements that inform how it is constrained, enabled, enforced, and so on, within projected design work.

Participatory Design

Participatory design seeks to scaffold non-designer participants through activities so that they can inform design decisions and impact the design outcome. The frequent justification for broadening the pool of individuals impacting design outcomes is that it is a fair and equitable thing to do [Feenberg, 1995; Bardzell, 2014; Bannon & Ehn, 2013], especially since the design will likely impact these users. Furthermore, diversifying who impacts design can increase potential creativity by developing multiple alternatives [Carroll & Rosson, 2007]. Through the creation of concurrent alternatives to existing design spaces, design processes can develop multiple trajectories to contend with large social problems. Given that no single solution exists to deal with large systemic social issues [Baumer & Silberman, 2011; Kolko, 2012], having multiple and varied methods for addressing issues helps explore promising alternatives. The exploration, development, and curation of alternative design space can be difficult to achieve because control over the production, distribution, and ongoing maintenance of technological design is often held by a small group of

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technical and business experts. In addition, including those that are typically excluded from

innovation practices attempts to address long-standing power imbalances within the unequal

distribution of decision-making over technological design. When contending with long-standing

social inequalities, issues of power (*e.g.,* decision making, etc.) are central to exploring social justice.

Finally, participatory design is frequently cited as a method to democratize or expand the design

process to include alternative interests and values [Ehn, 1988; Bjögvinsson *et al.*, 2012].

Design Workshops

I developed design workshops to uncover how different concepts of justice (*e.g.*, recognition,

reciprocity, etc.) can be traced throughout the design process. By design process, I refer to the

design workshops' discussions, decisions, designed artifacts, and outcomes. I developed several

activities (*e.g.*, specific questions, introductions, prompts, etc.) tailored to introduce participants to

a particular concept of justice, as each workshop series' activities focused on one. I crafted these

corresponding activities to infer how a particular concept of justice could be traced within the

design process (*i.e.*, Did they resonate with participants and their experiences, and did they

resonate enough to influence a decision? If they weren't seen as important considerations, what

categories of phenomena were considered important? When and under what conditions was the

concept laid aside for other concerns? And so on). The goal of these activities' development and

iteration was to provide an initial guiding structure, while being flexible enough to allow for

emergent themes to develop. I derived each justice concept from Lötter's framework [Lötter, 2011].

For a more in-depth explanation of the framework, please review Chapter 2. Lastly, during these

sessions, I explicitly avoided bringing up or directly prompting for "justice" (*i.e.*, asking participants

how they understood and defined justice). When asking and discussing potentially polarizing

topics, it can be difficult for people to shift from how they would like to perceive themselves (*i.e.*, an idealized self), to thinking through the different tradeoffs and concessions they contend with while struggling through the different social and material constraints of working towards a goal.

Design can become an apparatus with which to examine social phenomenon, and, in what follows next, I articulate why I selected Lötter's work over others for thinking through concepts of justice and design. I derive these concepts of justice from a political philosophy framework for the following reasons. First, this framework provides additional granularity as compared to other common frameworks. For example, whereas Lötter's framework examines justice from both individual and collective perspectives, many justice-based frameworks tend to recognize three concepts of justice (usually distribution, procedural, and corrective), but ignore other concepts such as recognition or reciprocity. For example, Rawl's work on justice [Rawls, 1971] tends to be criticized as an overly individualist position [Nussbaum, 2004; Nozick, 1974], whereas other work, such as Nielsen's Globalization and Justice, overly focuses on collectivist perspectives [Nielsen, 2003; Sen, 2011]. By utilizing a framework that allows me to focus on both perspectives, I add dimension between the practical individual perspectives, while having an eye towards the broad cultural milieu situating these practices. Secondly, Lötter's framework synthesizes other current work within the philosophical literature on justice, and as such is "constitutive of many current conceptions of justice" [Lötter, 2011]. Lötter's framework provides a wide breadth of concepts that are rooted in prior literature, which make it an ideal basis for developing generative tools to explore justice and design.

Each workshop series consisted of three approximately two hour design sessions. Similar to other design trajectories [*e.g.*, Fallman, 2003; Blevis, 2012], the workshop series was designed with the

following trajectory: 1) discussion of the problem space and available resources, 2) brainstorming interventions, and 3) refining those interventions. For each workshop series, I adapted techniques to this general trajectory and to the ongoing needs and opportunities that the workshops presented.

Initially, I primed participants with photography-based activities, based on Gaver *et al*'s Cultural Probe technique [Gaver *et al.*, 1999]. I created shared common ground between participants with a diversity of backgrounds (*i.e.*, participants were both community members and nonprofit organizational workers, etc.). Second, although participants have particular kinds of expertise and familiarity with their own lives [Sander & Stappers, 2012], I engaged participants to not just think about their issues, but to discuss and share food access issues with each other in order to foster common, shared understandings. Photos are a powerful tool for sharing experiences with others; they quickly reveal hidden assumptions and create space for understanding commonalities. Unfortunately, very few participants elected to participate in the optional photo activities.

In the last two workshop series, I offered participants optional design activities between sessions. These activities included independent brainstorming, journaling, asking their peers questions, and so on. Because of the short duration of the workshops, the optional design activities were useful to help people think ahead and jump-start conversations. Nearly all of the participants completed the optional design activities.

Workshop 1: Narrowing the topic space

The first workshop phase focused on building consensus towards a particular topic that the participants would subsequently design for. I created different tools for each workshop to help generate discussions geared towards a particular justice concept. For example, during the

workshop series focused on enablement, I used an assets-based approach [*e.g.,* Attanasio *et al.*,

2001] to discuss the different kinds of resources (*e.g.*, skills, assets, resources, or programs)

available to local community members that we could build upon, and what kinds of resources might

need to be created. This line of questioning tried to direct issues of enablement by discussing

individuals, self-development, and what barriers or resources could help "empower individuals to

be come interdependent cities competent to contrite appropriately to the effective functioning of

society through fitting social cooperation" [Lötter, 2011].

Workshop 2: Brainstorming interventions

The second workshop phase focused on brainstorming different interventions and approaches. For

this part of the workshop, I focused on creating tools that would help foster brainstorming different

interventions, systems, and approaches to contend with the outlined topic space. For example,

during the workshop series focused on distribution, we discussed and developed participants' food

distribution models, and brainstormed different ways technology could fit within that model. I

developed "what if" scenarios based on the Stanford's design mixtapes[3] and suited to the topic at

hand and the particular concept of justice, in this case distribution.

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[3] dschool.stanford.edu/wp-content/uploads/2012/02/understand-mixtape-v8.pdf

Workshop 3: Refining interventions

The third workshop phase focused on refining the particular design intervention we outlined in the brainstorming phase. During this phase, I developed additional discussion questions tailored to a particular concept of justice and the artifact we were refining.

With the participants' permissions, all workshops were video recorded.

Design Workshop Context

I conducted this work in Atlanta, Georgia and southern California with individuals from food access nonprofit organizations and local community members, who were either interested in food access issues and/or would likely have been the recipients of the workshops outcomes. Lastly, when and where possible I hosted the design workshops off campus. This was due some concerns and experiences in Atlanta, where I had some informative, but aggressive interactions with participants who had previously negative experiences with university researchers.

Next are the number of participants who attended each workshop session.

Participant Attendance per Workshop Session			
Workshop Group	**Session #1**	**Session #2**	**Session #3**
Workshop A	10	6	4
Workshop B	8	6	4
Workshop C	4	4	4
Workshop D	8	7	7
Workshop E	2	2	2

Initially, I wanted an even mix between attendees from the nonprofit sector and from lower income community members, because the diversity of these positions would lend well to gaining multiple perspectives on complex issues. Although all workshops included nonprofit workers and community members, these categories do not fully articulate who participated in these workshops, because the classification is not a neat binary. For example, one of my participants, an urban farmer paid by a local NPO to pilot a new urban agriculture program (but lives in place without direct running water and utilized on government assistance programs) is both an NPO worker and a community member. Similarly, in another workshop, at least two of the local nonprofit caseworkers who managed clients were also on government nutritional assistance programs. Such participant experiences highlight that these are not clear-cut categories.

Design Workshops Analysis

After each workshop, I wrote memos focused on empirical documentation of each workshop, including workshop discussions, the design decisions that were made, the rationale for their decisions, and how I might improve the workshop sessions. While running the workshops, I met regularly with advisors, faculty, and other PhD students to discuss trends, observations, and insights from the workshops. Dominant themes included the actual progress and outcomes of the workshops, emergent concepts of justice, and the relationship between my activities and the concept of justice within the workshop. I conducted a grounded theory based iterative and inductive analysis of my memos and workshop transcriptions using coding, memoing, and affinity diagramming [Charmaz, 2006; Corbin & Strauss, 2007]. During the first round of open coding, I focused on the workshops' emergent themes, including tracing the prompted concept of justice, tracing emergent concepts of justice, and understanding how other factors created constraints and resources for design within the process. During additional rounds of analysis, I focused on articulating the relationship between the concepts of justice and the emergent concepts of justice, and between concepts of justice and the different constraints and resources.

3.4 Phase 4: Joint Analysis

In my last phase, I analyzed my data from all three study phases. I conducted a grounded theory based iterative and inductive analysis of my memos and workshop transcriptions using coding, memoing, and affinity diagramming [Charmaz, 2006; Corbin & Strauss, 2007]. I focused on emergent themes from all of my studies. During additional round of analysis, I focused on understanding the limitations and strengths of sociotechnical public interventions for systemic social issues.

3.5 Subjective Experience and Fieldwork

In this section, I articulate a short "methods confessional" to demonstrate the factors that shape my own subjective experience of the workshop and that of the participants. This includes how dimensions of power, different perspectives, interpersonal dynamics, and tensions played a role in the workshops. Additionally, I briefly highlight how the differences between southern California and Atlanta, GA influenced the design workshops, including race and class issues.

Interpersonal power dynamics influenced the workshops in several ways. The workshop attendees comprised different individuals with various class, race, and socioeconomic status backgrounds that influenced their perceptions of food issues and the people experiencing those issues, which ultimately influenced how they oriented towards each other. By power dynamics, I refer to people's capacity to interact in a group setting, including voicing opinions, arguing for certain decisions, and so on. Predominantly, there were two large categories of individuals: those that worked for nonprofit organizations and those self-identifying as food insecure community members. Including both groups in the design workshops impacted the participants' ability to have discussions in different ways. In some cases, it was beneficial to have both types of individuals present because it appeared to put the community members at ease. In other cases, community members appeared reluctant to speak, which could be due to the presence of the NPO workers or myself (an outsider).

In circumstances when the community member appeared comfortable and willing to engage with the nonprofit workers, the workshop sessions benefited from having both types of participants. In these sessions, participants were more willing to speak and to be generative in the design process (*e.g.,* try out ideas or build on others). In these sessions, community members often worked with or had previous experiences with the same caseworkers and NPO workers in the workshops. These

community members appeared very comfortable with their caseworkers, and this generally seemed to put the community members at ease since they then freely asked the caseworkers for clarification during the workshop, directly discussed issues with them, and were able to build ideas off of each other. It also seemed to help that many of these individuals shared a high degree of cultural experiences, including race, backgrounds, growing up in similar communities, and so on. As mentioned above, participants often fell into multiple categories, as delineating between food insecure community members and those that work for nonprofits is not clear-cut. Frequently, nonprofit workers (e.g., case workers) may also receive federal nutrition benefits because they, too, are low-income and food insecure, but may also work for hunger-focused nonprofit organization. Additionally, differences in race, education, class, and other shared cultural experiences also affect how participants (including myself) make sense of and empathize with others in the workshop context.

Not all sessions exhibited smooth, comfortable interactions between NPO workers and the community members. In sessions in which community members appeared hesitant to voice an opinion in the presence of nonprofit workers, frequently those NPO workers held some sway or power over the community member. For example, they may have been their boss or a person from whom they received services, which likely impacted their willingness to participate and share ideas and experiences. In one workshop group, one of the NPO workers owed a community member money for yard work that had been done weeks prior, which caused unaddressed group tension. I was exposed to this tension when driving the community member to the workshop, since he disclosed that he was upset with the NPO worker for a refusal to pay for rendered services. These types of interactions likely impacted the interpersonal dynamics of the group, making the community member more unlikely to voice opinions.

There were tensions regarding my position within the workshop. First, while conducting workshops in Atlanta, GA, my association with Georgia Tech came with a complex, but troubled, history between low socio-economic status communities and the university. This was most strikingly observed during my first workshop when individuals left the workshop once they understood I was associated with the university. Second, in that same workshop, a particularly vocal participant expressed being very upset with the treatment his community received from Georgia Tech, and accused the university of not caring and stealing cultural knowledge without giving anything substantial back to the community. In all of these cases, I attempted to navigate and help people understand my position and what I was capable of offering.

There were several important differences between the Georgia and California workshops that impacted workshop dynamics. First, since not as many community members were able to attend the California workshops, people representing nonprofits dominated the room. In Georgia, many NPO workers appeared to have strong community ties to the neighborhoods and the individuals they served, and frequently grew up in those neighborhoods or had similar cultural experiences (*e.g.,* may have previously used a food bank or governmental nutrition services). The lack of shared cultural experiences influenced how workshop participants understood and discussed those that experience food insecurity. For example, in some of the California-based sessions, instead of trying to understand how an individual might experience oppression or food insecurity, there were many comments about what those individuals should be doing to alleviate their own symptoms of food scarcity. For instance, in one of the sessions without community members, one of the topics focused on how food insecure individual's "good" and "bad" choices on how they spend their tax refunds. Instances in which NPO workers had more in common with the communities and people they serve translated to qualitative differences in how those participants oriented towards the work they were

doing and who they were trying to assist. For those individuals that seemed to be "outsiders," in that they did not appear to share many experiences with the communities they served, a prevailing attitude was that of "helping" people. By contrast, the individuals who appeared to share more experiences with those they were serving (*e.g.*, grew up in local community, grew up food insecure, shared similar racial identities, and so on.) seem to recognize their shared oppression and joining them in their neighborhood's struggle.

All of these interpersonal and experiential differences matter for the different types of available expertise, both lived and professional, that become the knowledge pool rendered possible during the workshops. Race, class, and gender all come to matter as different individuals have different starting points, motivations, and concerns for why they are invested in addressing local issues of food insecurity, which in turn impact how the workshop sessions unfold and decisions are made.

3.6 Methods Summary

Each method helped me understand different facets of sociotechnical interventions and their relationships to concepts of justice. These methods included qualitative empirical methods to examine current practices and build relationships, and critical reflective design methods to explore the possibilities for action and change.

Chapter 4: Sociotechnical Practices of Public Interventions

In this chapter, I outline how access to sociotechnical public interventions relates to concepts of justice. This chapter examines the mismatch between efforts by the state to reduce food insecurity through an online application, and the on-the-ground work by local nonprofit organizations that make these online service viable for their communities. Distributional food justice focuses on the equitable distribution of the "benefits and risks of where, what, and how food is grown and produced, transported and distributed, and access[ed] and eaten are shared fairly"[Gottlieb and Joshi, 2013]. This chapter adds to the concept of distributional food justice the on-the-ground practices and supporting organizations that enable a more equitable experience of the food system. I examine how hunger-focused nonprofit organizations help their local community members access and use online government applications. I demonstrate that, while state-led technology initiatives hold the promise to create additional access to government programs, access to and use of online application services does not occur without considerable direct interpersonal and technical support by local nonprofits. Given the vital role these nonprofit organizations play for their local communities, I argue that design needs to move beyond just individual community members to take into account broader supporting social relations. Then, I outline how nonprofit workers create access to and use of, not just technologies, but also the underlying government service that the technology supports. In doing so, I highlight how concerns of access to sociotechnical public interventions relate to justice.

The sociotechnical intervention this chapter focuses on is an online e-Government service for a governmental nutrition program. E-Government is "the use of technology to enhance the access to

and delivery of governmental services to benefit clients" [Schneider & Bowen, 2010]. There is a significant investment in e-Government services [Input, 2012] and many stakeholders assume that these tools will lower access barriers for clients [Moon, 2002; USHR, 2010] and enable both client self-education and self-management of participation [NASCIO, 2010]. A widespread but implicit assumption prevails in existing e-Government literature that basic Internet access is the most pressing issue in promoting use of e-Government services [Bucy, 2005; Dijk, 2005]. This emphasis on the digital divide ignores the challenges of engaging with an online tool after access is achieved. The challenges of access and how it is actually achieved are important considerations for thinking through how to achieve the goals of the food access.

In this chapter, I focus not just on the technological access, but also access to the government program as a *service system*. Broadly, service systems involve assemblages of "people, information, organizations, and technology" [Lam & Rosenheck, 1999] synchronously performing a variety of tasks for the "benefit of another" [Silock, 2011], usually a client. For example, an insurance clerk helping a client navigate through available insurance plans, a nurse helping a patient enroll in a health program, and an attorney explaining trust and estate laws to their clients are all service encounters. Information technologies are often interwoven with these service processes and, more often than not, are a key aspect of successful service engagements. Exploring this relationship— how technologies can enable, constrain, provide support for, or disrupt the underlying goal of providing a service—is central to this research.

Existing research on service systems centers on the work of professional staff members who are employed by a service provider and whose work is integrated into the service process (*e.g.*, [Cook & Helbig, 2008; Grandey, 2003; Sewchurran & Bowen, 2009]). In this research, I study individuals

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who work alongside service organizations but are not formally affiliated with the organizations. By studying this type of service work, I can better examine the additional, and often invisible, forms of work that go into enabling a successful service encounter. An examination of this type of work also allows for greater clarity about how information technologies designed to provide access to a service relate to and integrate with the service, itself.

In my research, I analyze a specific type of service encounter in which an application process leads to an ongoing relationship with an information-rich organization. My research focused on a group of people who perform "outreach work." They work alongside a government nutritional assistance program, employed not by the government service provider but by local non-profit organizations. The service provider was in the process of transitioning to a new e-Government online system. Outreach work fulfills a crucial role in this new system by enabling access, providing information, and guiding clients who would not otherwise take advantage of the service. The research presented here examines these associated service components and characterizes the various activities, relationships, and knowledge sources that are called upon in the process of providing ongoing access to governmental food support through an online system.

In my analysis of this service system, I build on the concept of technological mediation. Technological mediation focuses on understanding how certain individuals provide others with information, access, and guidance in using technological tools [Sambasivan *et al.*, 2010; Silcock, 2001; Zandi, 2012]. This research on technological mediation has focused on how human mediators can play a pivotal role in making technology work for the benefit of others. Building on this concept, I find that mediators not only enable technology use, but also enable the underlying service of which the technology is only a small part. I, therefore, refer to this work as *service mediation*.

In the context of this research, *service mediation* takes into account a broad array of the technical, social, and knowledge labor practices involved in facilitating access to and use of services for clients. Service mediators, with their specialized and expert knowledge, assist clients in navigating bureaucratic complexity—the numerous options, rules, and regulations built into the system. *Social labor* involved in these encounters includes, but is not limited to, finding and educating potential clients and assisting with all aspects of applying for and receiving service benefits. *Technical labor* involves acquiring and utilizing an operational understanding of technical systems. *Knowledge labor* involves the ability to apply the operational rules and regulations of the service system to clients' situations.

In this chapter, I provide empirical and theoretical insight into four specific mediation activities: *outreach*, *technological assistance*, *providing knowledge*, and *ongoing engagement*. Together, these activities do more than allow the online application system to "work." Rather, the participants in my research enable the service, itself, to work. They do so by mediating service processes, relationships, and knowledge. The contributions of this research include an articulation of the complex relationships between a technology designed to provide access to a service and the kinds of labor involved in actually enabling services to work. Understanding the human effort required to make electronically mediated service systems work is necessary to understand how technology is enacted and made useful across different actors (*e.g.*, clients, outreach workers, social service workers) within sociotechnical systems.

When examining how access to e-government services happens in practice, there are several insights at the intersection of justice and sociotechnical public interventions. Investments by the state in new online applications for government nutrition programs are attempts to broaden access

to government nutrition programs. Yet, the ways that people access these programs in practice greatly differs from the ways that the online application system is set up to support access. Access is a concern of *distributional justice*. With distributional justice, the starting position is that the benefits and burdens of a food system should be fairly shared among all stakeholders, including how resources are distributed and accessed. I describe local nonprofit organizations' attempts to create and ensure access for underserved communities to nutrition programs. I found that access to government services is created through the additional interpersonal, procedural, and technical support practices of these nonprofit organizations. Therefore, the government's attempt to increase access with e-government tools is only partially successful, and in some ways shifts the burdens of access creation to the nonprofit sector. Currently, there is a mismatch between the aims of these online systems (to broaden access to services) and the targeted user population (who cannot use the systems without additional assistance). This gap is filled through these NPOs' practices. Using justice as analytic on these practices sheds on how these NPOs achieve justice-in-action. In this work, justice concerns here refer to distributional justice and how to enable additional access, or a more fair distribution of a service experience. I argue that the practices outlined in this chapter demonstrate a type of justice in action, and the practical, mundane work that is required to achieve access to and use of these services. Second, it demonstrates that that work of justice is not done for these communities, but it is rather a continual, ongoing engagement that these nonprofit workers have with their community. I argue that, by looking at these issues of access as a whole, government service design should explicitly include the broader support networks that make access happen, such as the nonprofit organizations in my study.

4.1 Research Setting and Context

In my research, I conducted an in-depth examination of a governmental program to support individuals who are food insecure, defined as a lack of dependable access to nutritious food. In the United States, nutrition assistance and financial support for purchasing food is available to any household below a particular income level. In 2010, a household of four was eligible if their monthly gross income did not exceed $2,389[4]. This[5] program is known nationally as the Supplementary Nutrition Assistance Program (SNAP), formerly known as food stamps, and in California, where this research was conducted, as CalFresh.

The county in which I conducted this research had one of the lowest participation rates within California. As part of efforts to increase participation in services and reduce food insecurity, California has recently supplemented its traditional paper application process with an online application process. The county in which I conducted this study used Benefits CalWin[6] as an online entry portal to multiple assistive governmental programs, including CalFresh. Although an online application may mitigate some of existing barriers and concerns, the technology itself cannot fully address each of the issues understood to be a challenge to participation. Please see my literature review for additional details on why food insecure individuals may opt of governmental food assistance programs.

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[4] http://www.sfhsa.org/157.htm

[5] http://www.ladpss.org/dpss/calfresh/eligibility.cfm

[6] https://www.benefitscalwin.org/

As part of a community-wide effort to increase participation rates in social services, non-profit organizations in California that are dedicated to fighting food insecurity often employ outreach workers. Outreach workers encourage potentially eligible individuals to apply for governmental nutrition assistance programs and support them during the application process. The outreach workers in my research were subsidized by US Department of Agriculture grants that support community organizations with a vested interest in food security.

Outreach workers are tasked with finding and assisting potential beneficiaries in applying for governmental food assistance. The work of identifying eligible participants and encouraging them to apply for CalFresh is particularly time intensive. Thus, this work cannot be handled by the administrators of CalFresh, the California Department of Social Services (CDSS), who are under pressure to be more efficient in response to state budget cuts. Outreach workers are notably not governmental workers and do not hold official positions within the government.

4. 2 Mediation Activities

The results of my analysis suggest that four practices are central to the success of outreach workers: *outreach, technological assistance*, *providing knowledge*, and *ongoing engagement*. The interplay between these various activities implies that outreach workers are more than advocates and different from technological mediators. They are integral in creating potential clients, informed applicants, self-advocates, and lasting beneficiaries. As such, outreach workers transcend prior definitions of either outreach or technological mediation.

Outreach Activities: Creating Potential Clients through Education and Changes in Self-Identification

Outreach workers conduct their work in a variety of places, focusing on locations frequented by food insecure individuals (*e.g.*, community centers, religious institutions, free health clinics, and other governmental nutrition assistance programs). When asked to describe how they find potential beneficiaries and convince them to apply for CalFresh, outreach workers described both face-to-face advocacy and the dissemination of printed information about CalFresh to potential clients. While advocating and distributing information, they also attempted to combat common misconceptions about the "kind" of person who participates in CalFresh. This involved explaining what is required to participate in the program and dispelling fears that participation might incur other negative ramifications. These activities worked to convince potentially eligible individuals that CalFresh was a viable and worthwhile option for them.

According to the outreach workers, individuals are often initially unaware of their potential eligibility and require some convincing that they are appropriate recipients of the service: "… people [we assist] had never thought about … food stamps as an option" (John[7], Outreach Manager). Educating people that they are potentially eligible is a necessary initial step in promoting a service to clients.

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[7] All names of participants are pseudonyms.

Eligibility is only the first hurdle in persuading a potential beneficiary to apply for the service. According to outreach workers, even those who know they might be eligible often do not apply. This resistance is in large part due to myths and fears surrounding CalFresh. "[I hear] all these stories…. There are a lot barriers, and they are real in the minds of these people, but they are myths" (Paul, Outreach Manager). These concerns include the mistaken belief that there are requirements to repay services, risks of deportation, requirements to serve in the military, removal of the children from the home, and so on.

Outreach workers make use of external evidence, such as documents from the Departments of Social Services (CDSS) and Immigration, to persuade individuals that CalFresh is a legitimate, non-harmful, assistive program. Some fears are so pervasive, even with official documents from the CDSS and the Immigration office that it can take months before a client will apply. Outreach workers are aware of these barriers and take pains to honor concerns and educate potential clients.

"Part of [our] job is to make [clients] understand that the government is not going to charge for [participation] and it does not affect their immigration status. I show them different letters, and I convince them and then [they will] apply. Those 30 people I bring, they never wanted to apply before, and I really have to introduce them and [say] this is not going to affect [immigration status]." - (Raphael, Outreach Worker)

A key aspect of combating these misconceptions and fears is the ability to establish rapport and trust.

"We have to build that trust. That relationship is very crucial. It takes about a month or two to get that one person to apply with you, but it does happen … I've seen it. I've been going to one place for seven months. [The client] finally made [an] appointment with us this month. That client has seen me every Tuesday. It's really important to stay consistent when you are doing outreach." - (Maria, Outreach Worker)

"Outreach workers travel to places where food insecure populations get assistance, such as food banks or free health clinics. This willingness to engage with people in their own territory can be a key aspect of fostering trust. The whole method is you have to go to them … Don't expect them to go to you." - (Maria, Outreach Worker).

A non-trivial amount of work goes into "creating" a potential CalFresh client. Through regular visits to outreach locations, repeat exposure to the same people, and one-on-one engagement with potential clients regarding the program, outreach workers build relationships and establish themselves as knowledgeable and reliable sources of information. This trust enables outreach workers to educate clients about the pervasive negative myths surrounding governmental assistance programs.

My results illuminate the importance of self-identification in the "creation" of potential clients. Clients must see themselves as potentially benefitting from participation in CalFresh or, alternatively, that the economic benefits of participating in the program supersede any previously held negative conceptions. In contrast to research on technological mediation that assumes potential beneficiaries are immediately discernible and willing to engage with a new technology, I find that a significant amount of social labor is involved in helping individuals see themselves as potentially eligible governmental program beneficiaries.

Technological Assistance: Creating Capable Applicants

Once a potential client has decided to apply for the program, outreach workers offer technological and informational assistance in navigating CalFresh's online application. Outreach workers cite a lack of access to technology in the home and illiteracy as reasons why technological assistance is necessary. According to outreach workers even potential clients with access may not be familiar enough with the Internet to complete the online application successfully on their own.

"The Spanish speaking population I'm dealing with usually won't have a computer in the household. They are not comfortable with the technology. I want them to get these benefits. I don't want them to sit there confused not knowing how to do it. It's not that I feel that they are incompetent like 'you would never fill this out correctly' its just you are not used to … having a computer in the household. I

don't want to make them confused or make them not apply at all. I'd rather be there to help them, and figure out their case." - (Isabel, Outreach Worker)

Beyond practical questions of technical competency and access, outreach workers mitigate issues associated with illiteracy, lack of competency with government jargon, and lack of familiarity with back-end functionality of the online system. Literacy is a multi-faceted issue. Some clients are illiterate in a traditional sense (unable to read or write well enough, even in their native language, to complete the program application). However, illiteracy is also context-specific; the online application uses bureaucratic vernacular that may be unfamiliar to clients even when translated into their native language. As such, it is similar to numerous online services designed for multiple populations, from websites outlining insurance coverage to tools designed to promote successful service engagements with banks, health care providers, or organizations tasked with addressing consumer complaints.

Outreach workers also provide technical assistance through their knowledge of the CDSS's operational processes and their growing expertise with the online application. Understanding the logic of the application is valuable in successfully interacting with the tool. For example, many online applications are denied because applicants click on the option for "expedited service" even though they do not qualify for that service:

"The first question [the online application] asks 'Do you want to apply for expedited services?' But unless you click on expedited services, it doesn't tell you what it is. People just assume 'well, obviously I want my food stamps faster than usual,' not realizing there's qualifications". - (Isabel, Outreach Worker)

Outreach workers' online application expertise partially stems from existing relationships with the CDSS. Outreach workers understand, for example, what information the CDSS typically relies on (and not) to process a case. As a result, outreach workers can help clients provide information that is precise enough for the CDSS but not so overwhelming as to be a substantial barrier to applying.

Ideally, online tools expand the avenues by which potential clients can engage with and access services. However, my results reveal that, for a variety of reasons, many individuals cannot independently engage with the information technologies designed to provide access. Outreach workers attempt to overcome practical issues of literacy, access, and technical competency in providing the expertise (and patience) necessary to "create" competent clients who can successfully engage with the online system. This subset of mediation activities is similar to the technological mediation discussed in previous research, enabling the access and use of a technology or technological system. While such activities are crucial in supporting the use of an online application that was created with the aim of increasing access, efficiency, and effectiveness in service distribution my findings suggest that that this form of mediation is augmented by other activities necessary to transform a potential beneficiary into a successful client.

Providing Knowledge: Creating Self-Advocates

In addition to understanding jargon associated with the application and the internal logic of the tool, itself, outreach workers have a deep understanding of how CalFresh is administered. As such, they can provide clients with tailored information and insight about the underlying bureaucratic process. This knowledge enables outreach workers to move beyond traditional outreach (finding beneficiaries) and technological mediation (helping people engage with a technological system) to help clients become self-advocates in the overall program.

In providing insight into how the CalFresh program works, and informing clients of their rights and responsibilities, outreach workers describe their job as transforming clients into self-advocates—people who know what is expected of them; what is expected of the CDSS; what the CDSS is legally bound to do and; if necessary, how to find actionable recourses. Outreach workers repeatedly told

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us that self-advocating clients are better prepared for interacting with the CDSS because they understand these expectations and commitments on both sides of the service relationship. Becoming a self-advocate requires both operational and accountability knowledge.

Operational Knowledge

According to outreach workers, explaining client rights and responsibilities—including what a client is eligible for, expectations of clients, and protections available to clients—is a key aspect of creating self-advocates. In particular, outreach workers provide insight into the interview process required for confirming eligibility. After submitting an application, the CDSS workers meet briefly with each applicant to determine his or her eligibility. Prior to the CDSS interview, outreach workers ask questions in a manner that draws out important supplementary information needed by a CDSS worker during the interview. Extenuating circumstances or an upcoming major change in the household can impact eligibility, but this information may not arise naturally during a typical CDSS interview. By carrying out this additional step with clients, outreach workers find that applicants are more prepared and thus more likely to receive case approval.

Accountability Knowledge

While outreach workers are not government employees and therefore have no formal influence over the CDSS, their work does provide them a great deal of working knowledge about how the CDSS operates in terms of administering CalFresh. In sharing this knowledge, outreach workers help clients become self-advocates in dealing with the CDSS.

"I let them know, they need to upload as many documents as they can, because that will make their application be considered "complete". … From the day they submit it [a completed application], the CDSS has 30 days, if they qualify, to give them their EBT card." - (Isabel, Outreach Worker)

In this example, the advice to complete the application is driven by the legal requirement for clients to receive notification regarding their CalFresh eligibility and enrollment within 30 days of receipt of submitted complete applications. However, the CDSS workers will not begin evaluating a case until it is considered "complete."

My data indicate that outreach workers facilitate conversations that set client expectations and provide information about CalFresh that they would not normally receive. By setting client expectations about CalFresh, and sharing knowledge about the CDSS's accountability, outreach workers can transform their clients into self-advocates, ideally enabling better client service outcomes. In "creating" self-advocating clients, outreach workers provide the infrastructure for individuals to independently handle unexpected or problematic situations. Outreach workers feel the practice of transforming clients into self-advocates saves time for outreach workers, as current clients advocate for the program to other potentially eligible clients, and guide them through the process.

The role of outreach workers in encouraging self-advocacy is a striking addition to current understandings of mediation and outreach. This process of empowerment has wide reaching implications for the success of e-Government tools and service applications more broadly. In making clients more independent, outreach workers contribute to the development of a sustainable system that, ideally, will simultaneously increase participation in the service and limit the need for additional outreach work.

Ongoing Engagement: Maintaining Eligible Clients

Finally, outreach workers work with clients to ensure they maintain service eligibility as long as their need for food assistance remains. My data suggest that outreach workers engage in two forms

of post-application assistance. First, they assist clients in submitting quarterly reports necessary to maintain CalFresh eligibility. Second, per the request of clients, outreach workers occasionally intervene directly with the CDSS to address issues of continuing eligibility.

Outreach workers report challenges for clients in maintaining program eligibility due to the complexity of the reporting forms. To remain eligible for CalFresh, clients must complete and submit a paper report every three months. The CDSS uses the report to re-verify client eligibility and monitor changes to income or household composition. Outreach workers explain to clients how the quarterly reports function, emphasize the report's importance for maintaining eligibility, and review required information:

"We go over the forms to give them an idea about what they are going to be asked to do later when they fill out their quarterly reports. Just to give them an advanced notice every three months …. So make sure you don't lose all your check stubs, keep track of them, because they'll ask you for them." - (Marisol, Outreach Worker)

According to outreach workers, most of their engagement with clients after integration into the program is initiated by the clients, themselves. Clients seek out outreach workers when they have a problem communicating with the CDSS or if they require additional clarification.

"I had one client call me to see what was wrong, because the social services sent her a weird letter. She didn't know what to do. I had to go over to her apartment and kind of read it over and tell her what it was [about]." - (Isabel, Outreach Worker)

By explaining the processes necessary for continued eligibility and offering assistance and advice when necessary, outreach workers help clients remain eligible.

In a variety of contexts, engagement with a service is not a one-time interaction with a technological tool, direct service provider, or mediator. Whether insurance, legal, or health care services, the time scale involved in establishing and maintaining a productive relationship with a service provider

adds a layer of nuance to the interplay between technological tools and successful dissemination of the service itself. While online tools might be designed to enable access to a service, these tools generally do not capture the complexity experienced when a client interacts with the service over a long period. Embracing a holistic perspective on the relationship between the use of a service technology and long-term engagement with a service program further emphasizes the need to conceptualize mediators as doing more than finding users and helping them engage with a technology but, in fact, "mediating the service" in a broader sense.

4.3 Service Mediations

In this chapter, I draw attention to particular types of service encounters in which application processes lead to deep and continual relationships with the organizations responsible for service provision. In such encounters, mediators' specialized knowledge and understanding of bureaucratic complexity assists in navigating options, rules, and regulations. My research extends existing conceptualizations of mediation by demonstrating how mediators do more than walk clients through the use of a technology. In actuality, they support the entire service process by actively generating potential clients, engaging in long-term assistance, and providing "third party" knowledge as expert outsiders. My examination of the activities of outreach workers draws attention to the technical, social, and knowledge labor of mediation and suggests the need for a deeper exploration into the complex and constitutive relationship between supporting a service and mediating a technology.

In conducting this research, I was initially surprised to discover the numerous activities in which outreach workers engage and the various roles they play in the course of their work (*e.g.*, confidant, cheerleader, technical advisor, procedural expert). Through my analysis, I am able to illuminate the

often-invisible work that goes into the enrollment of food service beneficiaries via an online tool. E-Government services are premised on an assumption that providing online components to existing services will enhance efficiency, access, and effectiveness. I have found that these enhancements are often only accomplished through a litany of additional labor.

Further, my investigation of what outreach workers actually do suggests that the concept of mediation already present in the literature is a valuable theoretical construct that warrants expansion into the realm of services. The mediation work of outreach workers includes not just technological mediation but service mediation[8], as well. Three characteristics of service mediation became apparent in the context of service mediators who hold expert knowledge of the underlying bureaucratic processes of service-providing organizations. My data suggest that service mediation in such contexts can be understood as facilitating a *process*, fostering *relationships*, and providing *scaffolding*. In unpacking these various facets of service mediation, I engage in a broader discussion of what a "service" is in the context of technologically mediated service environments.

Service as Process

Interacting with a service (via an online tool or otherwise) is often a continual engagement between service provider and client. Service engagements begin with the discovery that one is eligible for, and desiring of, a service and ends when he or she is no longer in need of the service. It is important

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[8] To be clear, service mediations in this context neither refers to "service-oriented architectures" nor "web services." Rather, here, I focused on how service is mediated in sociotechnical service systems.

to emphasize that information technologies are not, in actuality, the service. Rather, technological tools are designed to enable aspects of the service and therefore become implicated in how the service is described and understood.

By more fully understanding the relationship between an online tool and an overarching service it becomes apparent that it would be impractical and shortsighted to employ mediators for the limited purpose of facilitating access or helping with a single-episode use of a particular technological tool. By embracing the productive role of service mediators, designers and researchers alike are able to move beyond a limited (and temporally fragmented) view of outreach and mediation. From this perspective, hiring people solely to advertise services (as in the traditional view of outreach) or to sit with potential clients and provide instruction about how to use a bounded tool (as suggested by much of the work on technological mediation) limits the ability to engender a sustainable and successful service process. My research reveals that service mediation is better conceptualized as an ongoing process among clients, outreach workers, and service providers that benefits from multiple interactions over time.

Service as Relationship

Just as service provision is not only about a single encounter with a service system, services are rarely limited to a single relationship between a mediator and a client. Service mediators build relationships with a variety of people in their particular service ecology (*e.g.,* potential clients, friends and family of current clients, non-governmental organizations). In fostering these different connections, mediators are not only able to become information brokers better able to address client needs, they can foster productive relationships at a more abstract level—helping to forge relationships between various organizations and stakeholders.

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Service mediation, then, requires the maintenance of multiple relationships. Outreach workers foster relationships with gatekeepers in the spaces where prospective clients might be found (community centers, health clinics, religious institutions). They nurture ongoing relationships with prospective clients and maintain these relationships as prospective clients transition from interested party to applicant and eventually to beneficiary.

In addition, the successful mediation of a service engagement requires mediators to foster relationships with key people outside their immediate purview, particularly in the CDSS. These relationships enable outreach workers to acquire pragmatic working knowledge about the administration of the governmental program. Further, these relationships provide social capital that allows outreach workers to intervene productively on behalf of their clients. Not only do outreach workers see themselves as a bridge between clients and the service program (rather than simply the service technology), both the CDSS clients and employees also treat them this way.

Finally, viewing services as relationships also highlights the difficult, and often fraught, position of being perceived as a bridge. The risk here is that some clients mistake outreach workers for representatives of a service program for which they do not directly work. For example, outreach workers in this study showed great insight into how the CDSS works organizationally. However beneficial this insight could be in addressing questions and smoothing tensions, outreach workers expressed a concern that clients saw them as the face of the government or with powers similar to those held by CDSS case workers. These impressions negatively affected the outreach workers when clients were unable to understand why outreach workers did not have access to information regarding their cases. Such misattribution also increased work for the outreach workers as they filtered and vetted calls that should have been directed to the CDSS.

Service as Scaffolding

Conceptualizing how mediation is productively applied to the realm of services requires attention to the constitutive role mediators play in service provision. Not only do mediators support service provision and play an active role in recruiting potential clients, they scaffold the entire service endeavor. By helping transform potentially qualifying but non-participating individuals into independent clients able to engage productively with the service, service mediators help to provide scaffolding that furthers long-term goals of flexibility and sustainability.

This research presents striking examples of how mediators fill knowledge gaps in the communities they serve. Outreach workers engage in education—teaching individuals not just about isolated issues but also giving people the tools, confidence, and information necessary to develop productive long-term relationships with service providers. In essence, by providing regular assistance along a number of dimensions, mediators are able to embolden clients to be better able to assist themselves.

4.4 Conclusions

My research expands the conceptualization of mediation work within HCI and explores the technological, social, and knowledge labors associated with outreach work. By seeing outreach through the lens of mediation, I extend the concept of mediation in a manner that has implications for the design of online service applications and the relationship between service technologies and service programs more generally. In what follows, I articulate some implications for design relevant to the types of service mediation I observed in my research and put forth an exploratory framework for a larger research agenda based on the concept of service mediation.

Designing for Service Mediators

Different and complex elements work together to create the provisioning of a service system. In my research, I have shown how mediators are a part of the complexity of service provisioning in extending the reach of service technology and promoting the service, itself. The implication, then, is that designing technologies and systems targeted towards improving the capacity of mediators will improve the reach of these technologies and services. To achieve this end, design should consider the needs, goals, and challenges mediators face within their service ecosystems. Therefore, I ask how design might serve mediators as well as clients and service providers, with the assumption that such design would improve the vitality of the entire system.

Integrating mediators into the process and technology:

Service technologies are often designed assuming that the service client will be the primary user. However, my research indicates that users are much more varied, suggesting that such service systems (both technical components and the work processes within a system) should be redesigned to take into account the complex sociotechnical relationships that support effective outcomes for clients though mediated interactions with services and service technologies. For example, current online application tools could be redesigned to support a "community-based manager" user who can access and personally manage multiple cases, while still granting individual access to clients. With such a redesign, mediators could better manage their clients' cases, and officially communicate with the CDSS on behalf of their clients. Additionally, this redesign has the potential to legitimize mediators' position with both the CDSS and their clients, create more accountability for clients, and make transparent who is receiving external assistance.

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Design for preexisting complex relationships:

In this research, I have demonstrated that the social labor of fostering relationships among multiple parties is critical to the work of mediation. Design that leverages mediators' robust and complex relationships with both clients and service-providing organizations could improve the social capital and capacity of the mediators, enabling them to reach and assist a more distributed set of clients. For example, an application that allows clients to recommend mediators to others through a social networking site could engender a "warm introduction" and assist with outreach activities. Beyond building relationships with clients, a key skill of a mediator lies in the knowledge labor of obtaining a nuanced understanding of the service, information often distributed across different individuals in the service ecology. Therefore, design should also foster information exchange among key parties to keep mediators informed and up to date. For example, an online community that allows different individuals in the service ecology (including other mediators) to post and answer queries would increase access to pertinent information.

Design for low-resource and inconsistent infrastructures:

The mediators in this research often worked in locations where they had less than ideal access (or no access) to technical infrastructures necessary to submit online applications (*e.g.,* WiFi, cellular). Thus, systems must be designed to consider the unreliable and inconsistent infrastructures in which mediators work. For example, a simple redesign allowing for the local input and storage of information, able to be uploaded and submitted once connectivity has been re-established, would greatly improve the usability of the CalFresh online application. Designing for unreliable infrastructure expands who is able to benefit from technological advancements.

Research Agenda for Service Mediation

Moving forward, a research agenda for service mediation agenda should focus attention on the importance of service mediators in building and maintaining relationships within the ecology of stakeholders in their domains including inter-mediator relationships, mediator-client relationships, service-provider and mediator relationships, and relationships between the mediator and outreach organizations. Orienting questions for such a research agenda might include:

1. What are implications for the dissemination of expertise? How is expertise transferred, shared, and learned? What kinds of expertise are needed for successful mediation?

2. How can novel technologies support mediators' diverse relationships among clients, service providers and other mediators, including sharing and distributing resources that enable service mediators to communicate, support, educate, and meet with each other and clients?

3. How can underlying service infrastructures be redesigned to accommodate mediators' activities, including assisting with applications and communicating with CDSS, in ways that both legitimize a mediator's position while granting clients control over their case?

4. How can design enrich mediators' capacity to conduct service mediation activities, such as incorporating community-based organizations and clients into outreach activities or training new service mediators?

5. How do clients experience the larger ecology of stakeholders implicated in service mediation?

This research agenda should be explored in different domains, beyond that of food insecurity, using empirical and critical perspectives as well as design research methods, including participatory design and action research.

Conclusion

Using the concepts of justice as an analytic through this work details the often invisible work necessary for enacting more equitable technological arrangements between the state's interventions and its intended "users." This work suggests that systems, services, and technologies

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meant to address an existing inequality require supporting external practices to the service. In constellation, this work can give us insight into thinking through the additional, invisible work that is required to create more equitable access to services and food resources. It suggests that technological interventions should not ignore local community partners, but rather join them to facilitate new access and new beginnings towards equity. Just as democracy is "an endless meeting" (Polletta, 2012), so, too, is the work of justice comprised of mundane practices that slowly work towards creating more equitable arrangements for access.

These mediators enable access to and use of technologies and service programs. The participants in this research engaged in outreach activities, technological assistance, knowledge provision, and ongoing engagement. Such on-the-ground practices expand who is able to benefit from use of and access to technology and services. Through these activities, they mediated productive relationships with multiple aspects of service provision, not just the use of service-related technologies. Understanding all of the work that is required allows for a more nuanced insight into the multiple dimensions of making a service functional for the local community.

Service mediation involves fostering a process, mediating relationships, and providing broader scaffolding. In this research, I discuss how multiple practices involved with service provision (technical, social and knowledge) are key to the successful deployment of online service tools. That potential beneficiaries do not necessarily see themselves as such speaks to a need to expand understanding of mediation beyond the realm of tool or technology, and into the realm of outreach. By acting as educators, advertisers, and advisors, mediators take an active role in service engagement long before and after they assist users with online tools. By attending to this and other

complexities of mediation, I highlight the numerous tasks, relationships, and forms of knowledge that enable successful service provision.

My research teases apart and highlights the distinction between the service and the technology designed to further its goals. Further, I direct attention to the key role mediation plays in bringing potential clients to the online tool, providing assistance to make the tool work, and helping to maintain ongoing relationships with the service that the tool means to support.

Service technology design tends to focus on the dyadic relationship between the client and the technological artifact. My research, however, suggests a broader ecology that needs to be considered in the design of service systems, including the important role of mediators in service engagement. Likewise, the broader social context of potential clients must be addressed, such as finding ways to counter myths about services that are sometimes propagated within local communities and that impede a service's use.

My construct of service mediation extends existing concepts of mediation work, providing a more holistic understanding of the different kinds of labor involved. My research contributes a detailed and empirically grounded description of the work practices that enable mediators to support entire service processes for their clients, including the "creation" of clients and their support throughout an ongoing engagement. These insights provide a rich, situated context for understanding the role of technology in service provision, and begin to suggest ways in which the field of HCI can support the sociotechnical ecology of service mediation.

Chapter 5: Designing for Collective Action Amongst Hunger-focused Nonprofits

In this chapter, I present findings from a research-through-design project, in which I co-designed an inter-organizational location-based information system to help local nonprofits address shared information goals. Based on this study, my work shows that the inter-organizational politics of funding, visibility, and control must be taken into account when designing for collective action among hunger-focused non-profit organizations. In doing so, I highlight how designing for collective action relates to justice.

In any given location, multiple diverse organizations typically support food delivery to those in need. While these food service organizations themselves, and those they serve would benefit from coordination and collaboration among organizations, achieving this goal is not easy. The variety of skills, information resources, and technologies used to collect and aggregate information about clients and food resources is diffuse and highly varied. Food services and programs are physically distributed across a large geographical space, with each program including largely different eligibility requirements that address different client needs. Furthermore, the overhead of connecting and coordinating efforts across multiple organizations is significant. In a severely resource-constrained environment, in which there are not enough people, computers, or food resources to meet everyone's needs, these organizations have been forced to specialize their services and limit the geographic areas they serve. This approach results in a geographical, temporal, and human jungle that clients, volunteers, and service providers navigate everyday. Location-based information systems (LBIS) provide the opportunity to support understanding of

and access to the heavily location-based information needed and used in the process of matching food resources to those in need.

Location plays a key role in helping the hungry find food, and connecting under-utilized food sources to food distribution centers. However, the nonprofits I studied present some specific challenges with respect to designing location based systems. For example, the physical location of a nonprofit may be less important than its mobile food distributions sites – which only exist at certain times and places. Likewise, these food resources may only be accessible to individuals within certain geographical areas (either due to distance or eligibility requirements of a specific program). Nonprofits also have concerns about privacy and disclosure. The increase of location-sensing technologies has coincided with growing body of work on privacy and location-disclosure (*e.g.,* [Consolvo *et al.*, 2005; Hsieh *et al.*, 2007; Iachello & Hong, 2007; Tang *et al.*, 2010]). However, this work predominantly focuses on end-user consumer scenarios, and not organizational settings. My work builds on the organizational perspective of Troshynki *et al.,* who reframe traditional conceptions of privacy in location-based systems by arguing instead for an analysis of the accountabilities location-based systems enable [Troshynski *et al.*, 2008].

Beyond location related concerns, nonprofit organizations often have several key technology challenges. Predominately, these organizations work in low-resource settings (*e.g.*, [Le Dantec *et al.*, 2008; Voida *et al.*, 2011]). This situation is often referred to as the "organizational divide," suggesting that disparities exist between organizations that can and cannot use technology to further their mission [Kirschenbaum & Kunamneni, 2002; Kvasny & Lee, 2011; Schneider, 2003]. Limitations in the ability to productively engage with technological resources hinder the capacity of organizations to collaborate in service of a shared mission [Stoll, Edwards, & Foot, 2012].

Additionally, much of the nonprofit workforce is volunteer-based. The technical skills and expertise within a particular organization's volunteer workforce constantly shift, thus creating the need for continual retraining [Voida *et al.*, 2012; Woelfer & Hendry, 2009]. The organizations I examined experienced varying constraints in terms of technical skills, equipment, and access to infrastructure. In terms of thinking about how to design public sociotechnical interventions, I was careful to attend to the sensitivities between nonprofits and their clients.

In this chapter, I present the results of an 18-month qualitative research study, in which I worked closely with nonprofit organizations focused on issues related to hunger. In the course of my empirical engagement with these organizations, two key goals emerged: first, they aim to match clients with information and services concerning existing food resources in the community. Second, they attempt to infuse new food resources into the community where possible. Due to the highly location-based, yet fragmented nature of their work, there is a substantial opportunity for location-based information systems to assist in these goals.

In this chapter, I first describe the initial formative qualitative research's results, including specific location-based information needs that staff and volunteers encounter. This overview is followed by a discussion of my cooperative design activities and the design considerations for a location-based information system (LBIS) for hunger-based nonprofits that resulted from these sessions. I close with a discussion of the ways in which location-based information must be reconsidered in light of the issues that arose in my studies, in particular as part of design work for LBIS for organizations providing location dependent services.

The contributions of this chapter are three-fold. First, I present a set of issues that must be considered when designing location-based information systems for ecologies of nonprofit

organizations oriented around an overarching social need. Second, I highlight the ways in which the need for inter-organizational support in severely resource-constrained environments impacts the design of ubicomp systems. Third, I describe how location, time, and resources come together to create a kind of patchwork spatiality. While not a traditional static "map," such spatiality is essential to interactively model and engage with for an LBIS to effectively support the hunger and food service ecosystem.

When examining online application systems, there are three key insights at the intersection of justice, design, and sociotechnical public interventions. First, nonprofits need to match existing (and often limited) resources to local food needs. Second, nonprofits frequently run out of resources and need assistance finding, sharing, and distributing food. These information challenges are larger than any single organization can handle, and therefore the decision was made for the information system to work across nonprofits for collective action. Third, collective action concerns *justice as reciprocity,* or how to implicitly and explicitly agree on the level of cooperation or relationship while working towards justice. Challenges around cooperation arise when attempting to design for collective action across these nonprofit organizations. For example, while these organizations may be on the "same side" in terms of their goals, they still must compete with each other for their own viability through funding, donations, and even clients. Therefore, while a collaborative location-based information system presents new opportunities for sharing information across organizations, these organizations also need to control their own data and accounts of impact. Systems should not be presumed neutral and instead should attend to inter-organizational politics of funding, visibility, and control that must be taken into account when designing for collective action.

5.1 Qualitative Field Study

The methods for this research are discussed in detail in Chapter 3. As a brief summary, this chapter is based on a multi-method study that began with 32 qualitative interviews and 30 hours of observation, followed by a cooperative design project, and concluding with a final prototype evaluation. In this work, I took a multi-method approach, using qualitative empirical and design methods to understand the challenges and opportunities facing organizations that serve people who are food insecure. Specifically, I undertook a qualitative field study, in which I performed participant observations, shadowing, and formal and informal interviewing. I then began a cooperative design phase of my work focused on creating a location-based information system. Finally, I conducted an additional interview study to validate and refine my design considerations. In this chapter, I detail each of these phases in turn.

5.2 Local Food Service Nonprofits

This work focuses on nonprofit organizations working toward a shared mission to support underserved people, which in this context includes local community members in need of food assistance. In a limited geographic area, usually county or city wide, these organizations deliver highly specialized food-related services to benefit their clients. These services range from preparing and serving hot food to clients to collecting and delivering food resources to client-centric nonprofits. Likewise, their client interactions range wildly, dependent upon the work and services provided with some nonprofits working daily with clients and others never directly meeting them. Further, these nonprofits tend to work together in formal and informal capacities, such as setting up food-related programs together or to simply have an awareness of each other's services so they can send clients when necessary.

The Problem Space

The participants in my qualitative study all reported use of location-based information, but how they used that information and its form varied based on their particular work needs, resources, and constraints. During my field study, I identified two goals fundamental to the missions of the nonprofits I studied that currently stretch the capacities of these organizations. Each goal could be served by the creation of LBIS tailored to this population. Before moving to the design considerations for these LBIS, I outline the problem space and empirically ground these findings through detailed profiles of specific stakeholders.

Nonprofits need help matching clients to food resources

These nonprofits seek to alleviate hunger through a variety of food resources and attempt to match available resources to specific clients' needs. Services range from providing clients immediately accessible food items—such as goods from a food pantry—to assisting clients in registering for longer-term government programs, such as the Supplementary Nutrition Assistance Program (SNAP) or the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Such programs often have complicated regulations, eligibility requirements, and require clients to show up at specific times and places for registration, which may hinder program entry. The ability to access and utilize these resources thus requires a level of expertise within these systems. This can be particularly difficult for those with limited education, literacy, and social resources. In response to this complexity, hunger-based nonprofit organizations act as intermediaries to support people getting the food resources they need [See Chapter 4].

Clients themselves have particular needs and preferences that must be understood and modeled in any information system designed to support the food resource delivery process. At a rough level,

need is delineated between emergency food needs and supplemental food needs, with the term

"emergency" indicating that the individual needs assistance very soon, usually within a day. Clients

often also have dietary restrictions, ethnic preferences, or preparation preferences. For example,

individuals living in hotels might not be able to cook food, thereby requiring food that can be

consumed without a lot of additional preparation. When designing systems to interact with such

hunger-based nonprofits and communities, the complexity of how food resources are defined and

understood by multiple stakeholders must be accounted for within the designed artifacts.

Finally, those wishing to support organizations that provide food resources must also navigate a

complex delineation of acceptable donations, locations, and times for drop-offs. For example, food

resources in my fieldwork were often demarcated in the following categories: hot and prepared

foods, short term foods (like fresh produce, dairy, and other foods requiring refrigeration), and

shelf-stable foods (like canned and boxed items). These categories have semantic meaning related

to the length of time they can be stored and how long it takes to reach the client and thus impacts

the organization's ability to accept and process such items. Therefore, in order to render food

donations usable, nonprofits must educate and organize those attempting to provide resources.

Nonprofits need to connect with new sources of food

While food banks often provide a variety of physical food items to other nonprofit organizations for

distribution, the food they distribute is a limited resource. Collectively, nonprofit organizations

experience difficulties serving their client populations, because food resources are limited and

demand continues to rise [Bosman, 2009; Warshawsky, 2010; Zezima, 2007]. Tightening budgets

and limited food resources may force food banks to restrict the number of organizations they

distribute to because they have a limited amount of food to allocate.

"From a food bank perspective, one of our great challenges and frustrations is that we never have never have enough food to go around. We have to limit how much each of our charities take. We have a waiting list of 36-38 organizations that have applied and want to be members of our food bank, but we have to say, 'Sorry, we don't have enough food for you'. It seems both ironic and tragic that we [as a food bank] would have to be so restrictive in terms of the food we provide to people and to other nonprofits." – (John[9], Executive Director of a Food Bank)

These food shortages can be addressed in two ways. First, nonprofit organizations can shift the burden away from local resources by assisting clients with the process of applying for governmental food assistance programs (*e.g.*, WIC, SNAP) dedicated to alleviating hunger. Second, making connections between nonprofits and food donors, such as restaurants with left over food or farmers with surplus crops, would infuse local communities with previously untapped food resources. However, there are notable overheads for potential donors. Not all nonprofits can accept and process "hot and prepared" foods or fresh produce. Therefore, there is an opportunity to facilitate donations by establishing a matching process between potential donors and nonprofits to route donations to the right time and place to meet current demands. In sum, a multi-pronged approach is necessary to help nonprofits connect with new sources of food that includes both supporting participation in supplemental governmental assistance programs and facilitating resource allocation across the ecology of food providers and distributers.

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[9] All names are pseudonyms.

Nonprofit Stakeholder Profiles

In this section, I use profiles to highlight information usage and requests that occur within food assistance nonprofit organizations. These profiles represent a blend of personalities and experiences from my fieldwork. Each profile is grounded in my empirical data, including interviews and participant observation, but the details are used in amalgamation to make the specifics of this complex context accessible to my readers. One profile focuses on the work of those within a nonprofit attempting to match clients with food resources while the other takes the perspective of someone within a nonprofit oriented around gathering food resources from the community. Both of these stakeholders have location-based information practices that could be enhanced by a collaborative LBIS.

These profiles reveal the ways in which various nonprofit organizations are interconnected and the range of information needs required to accomplish everyday tasks. Further, they highlight how the lack of certain types of information can cause informational bottlenecks for workers at these nonprofit organizations.

"The Secretary"

Susan, a retired teacher, is a volunteer at a community center that provides food resource support for local residents. When local residents call her community center seeking food assistance, Susan provides information and advice. To help them, Susan uses her knowledge about the various food-resource programs and her working relationships with other nonprofit organizations. Depending on the needs of the client, she may recommend that the client come to the community center to pick up food resources (usually called "emergency assistance") or recommend the client connect with another person who can help him or her sign up for supplemental nutrition programs. Susan also

receives calls from people looking to donate food resources. Depending on the amount and type of food, Susan directs the donor to donate to an organization that can make use of the food, typically a local food pantry that directly services the community. After each encounter, Susan records her interactions and the type of assistance provided in a notebook. Creating accounts of her work is important for the community center because many donors and government agencies require nonprofits to articulate their community impact to receive resources.

In terms of location based information needs, secretaries like Susan must assess the needs of the client immediate, match them with the appropriate nonprofit service agency, and provide directions to that service agency. This type of information work requires in depth knowledge of the variety of programs available. This includes understanding eligibility requirements for multiple food resource programs and knowing which types of resources organizations can use at any given point in time.

"The Weekend Nonprofit Gardener"

On the weekends, George, an enthusiast gardener, leads a small local nonprofit that harvests orchards and other local produce. He is one of what are sometimes called food rescuers or "gleaners," harvesting his neighbors' apple trees or vegetable patches. George then donates, delivers, and distributes the collected produce amongst several nonprofit organizations that directly serve the local food insecure populations – in this case, a food pantry and two soup kitchens. Like other gleaners, George's mission is to decrease food waste through finding and distributing underutilized food resources into the community.

In terms of location based information needs, George must connect with homeowners who want to have their property gleaned. Beyond an initial introduction, this type of nonprofit must also often

provide ways for these landowners to account for their donation and release the landowners from liability for accidents that may occur during gleaning activities. Second, the relatively short shelf life of the harvested produce requires that these nonprofits quickly find other nonprofit organizations, typically food pantries, to process and distribute the produce directly to community members. Nonprofits directly servicing clients place a high value on this fresh produce as it is in high demand by clients. Gleaners fit a particular niche in the nonprofit sector since larger organizations are often unable to perform this work. These location-based practices require not only location information, but also working relationships that develop over time.

These vignettes highlight the relationship between the different types of people and organizations addressing issues of food insecurity their unique location-based information practices. Understanding the context of this work and these relationships is prerequisite for designing location-based information systems for this population.

5.3 Cooperative Design

Following my qualitative field study, I engaged in cooperative design sessions to understand how particular technologies might work within and impact these organizations. Working closely with three key participants from two organizations, I co-sketched a variety of potential design concepts to understand how particular technologies might work within these organizations. These sessions added nuance to my thinking on how organizations work together to assist their local communities. The result of these cooperative design sessions included sketches and a functional prototype (see Figure 1 below for a screenshot of my functional prototype). When working with low-resourced populations and organizations with limited exposure to ubicomp systems, it can be helpful to conduct interviews with a functional prototype in hand. I thus conducted seven additional

interviews with hunger-based nonprofit workers from five different organizations. During the

interviews, I used my prototype and sketches to solicit feedback on my design concepts to further

refine both my overall design considerations and prototype specifically.

During these interviews, I engaged in concept validation by requesting feedback on potential

mapping application designs to investigate how such technologies might play a role in their work. I

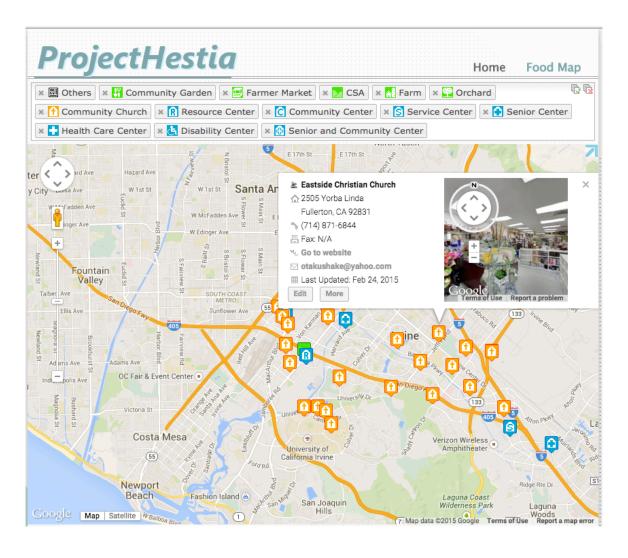tailored my feedback requests depending on the role of the worker.

Figure 1: A Screen Shot of Project Hestia

5.4 Design Considerations

In this section, I present four design considerations for designing LBIS for nonprofit organizations and related stakeholders who are focused on serving under-resourced populations within their local communities. For each consideration, I ground my results in empirical data and share concrete design examples. These design considerations seek to enhance how organizations work internally, serve clients, and collaborate with other organizations to provide food resource assistance in their local communities. However, each of these considerations carries implications for the organic interactions and social relations that occur within this nonprofit space. While not a comprehensive list, I end each consideration with related tensions revealed during my analysis.

Support the Role of Intermediaries

A variety of stakeholders play the role of an intermediary between food resources and people in need [Pothukuchi, 2004]. In the context of my work, these individuals play a critical role for clients by stitching together customized sets of resources from a variety of programs and organizations. For example, intermediaries, such as food bank secretaries, might offer advice to clients on how to navigate various organizations and programs in order to secure food resources.

Intermediaries often connect community members to the network of social support provided by the ecology of food assistive nonprofits. Once the intermediary determines a client's needs, he/she will often provide additional information to connect him or her to other assistive organizations and programs.

"If someone comes in for emergency food because there's no food in their home, there's a whole lot more need than just food. That one box of food -- although it might fill their stomach tonight, will it help them much beyond that? If it only feeds them for two maybe three days, then nothing has really changed. That's why the key component to that is getting them into advocacy programs. Let's find out

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what's going on and help address the problem." – *(Donna, Director of a Low-Income Family Oriented Nonprofit Organization)*

These supplemental food programs assist community members for longer periods of time while attempting to address the client's specific issues. This work often includes finding and referring clients to programs located at other organizations. Beyond interacting with clients, intermediaries can also become hubs of information for people seeking to donate food resources to nonprofit organizations. Usually, individual donors looking to offer resources may be from a smaller nonprofit or even an individual unaffiliated with a nonprofit. In such scenarios secretaries are in a position to connect these donors to organizations that can use their resources. Such practices suggest that designing for the intermediary benefits multiple stakeholders, including community members, potential volunteers, and other nonprofit organizations.

By explicitly designing with intermediaries in mind [Sambasivan *et al.*, 2010], I can explore opportunities to better connect community members with a network of social support. Given the importance of these intermediaries to particular clients and nonprofits alike, design should seek to strengthen how these people can provide access, information, and resources to multiple stakeholders.

First, by mapping currently existing locations of food resources available to low-income individuals, a system could provide intermediaries better understanding of available resources. For example, a system that maps currently available resources by location would support intermediaries in matching people and food and encourage the discovery of new potential places that could assist clients. Reducing the amount of travel to food resources would lessen the potential for hardships and barriers specific to the food insecure populations. Coupling these data with complementary location-based services creates new functionality. For example, using public transit information

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helps find not just the physically closest services by proximity but also the accessible locations that might best serve clients' needs. Further, it could help food advocates and community members craft arguments to local governments as to why public transit should be serving particular locations.

To support the work of the intermediary through location-based information system, designers must consider multiple users and technological beneficiaries, including the "intermediary" and the client seeking services. The variance in the type of users presents an opportunity to design interactions across multiple platforms, in which transactions are partially handled by the client and partially by the intermediary. Given that client populations often own mobile phones[10] but not necessarily personal computers, a system could allow a client to send location information from the mobile device to the intermediary who could then explore the feasible options and present them to the client. This expansion of the accessible food options for the client is made feasible through the work of linking multiple, but previously disconnected, information systems.

To return to the profiles, clients often call Susan, the nonprofit secretary, to request food assistance. After having a quick conversation with the client about what assistance is needed, Susan might learn that the client doesn't have a car. During their conversation, the client could tell Susan his current location. In turn, Susan can then use that information to tailor her search results to recommend a nearby food pantry that is accessible using public transit. Susan is then able to

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[10] 80% of adults living in households with less than $30,000 per year own cellphones and 43% own smartphones [Roberson and Nardi, 2010].

provide her client information on the food pantry's location and hours of operation and the bus route necessary to get to the food pantry. These client-intermediary interactions benefit the client because intermediaries like Susan often recommend a set of programs that work well together to help fit the client's particular food needs. Even if clients are able to directly access the LBIS, intermediaries have an informed and intimate understanding of the often-complex rules and regulations across available services. Additionally, intermediaries can sometimes provide solutions to the underlying causes of the client's need, possibly suggesting services about which the client may not have been aware.

Of course, any design that attempts to support the role of intermediaries must also consider the unique position such people play in the ecosystem. In acting as boundary spanners and information brokers, intermediaries, like Susan the food bank secretary, are most successful when they are able to work at the margins between established organizations—creating social capital with diverse individuals, learning about potential loopholes in existing services, and brokering alignments between clients and various potential resources. Thus, any system that formalizes these practices (such as an automatic recommender system) at the cost of flexibility and individual agency may end up damaging the ability of intermediaries to perform their unique role in this ecosystem.

Match Resources to Need

Nonprofits face significant challenges in both matching client needs with specific programs and building connections between organizations that distribute food and their potential food donors. Thus, not only should LBIS systems take the brokering role of intermediaries into consideration, they should also foster communication among nonprofits. Ideally, a system would promote access to information about various programs and resources, provide avenues for investigating the

services that others offer, and the incorporate the ability to broadcast information to others in the ecosystem. Currently, even when programs are identified, nonprofits have limited ability to know about, let alone accommodate, a fellow agency's ability to support new clients.

To facilitate this coordination, LBIS could allow nonprofits to indicate their locations and business hours, details about the various programs they offer, eligibility requirements, and so on. A LBIS could also support individuals seeking to donate food resources, such as the gleaner George, by allowing organizations to indicate their food needs and preferences, ability to process certain types of food, and business hours during which that are able to receive food. Finally, such a system could also let potential donors post that they have excess resources they are willing to donate, even if they lack the work force or time to deliver those resources.

The benefits of such a system for Susan are easy to imagine. For example, if her nonprofit's soup kitchen has temporarily run out of food she would be unable to provide immediate aid for a young couple who just arrived and are in need of assistance. While still informing them about some longer-term services, Susan could use the LBIS to locate a nearby organization and confirm that this location still has food for the day. In addition, Susan could provide the couple with information about the closest organization to the address of a family member the couple will be staying with in the upcoming weekend.

Before exiting the LBIS, Susan could then quickly indicate that her organization could use some additional food. She adjusts the hours listed during which they accept donations— she is willing to stay late if it means helping feed a few more mouths. Meanwhile, George, the gleaner, frequently donates surplus produce to nonprofits. He could then use the LBIS to find a donation site and find several locations (including Susan's nonprofit) requesting additional food resources. With a finite

amount of produce, no gleaner can donate to them all, but he might choose Susan's because he is familiar with her and knows she can quickly process and distribute fresh produce to the local neighborhood. Learning that Susan is short on food for the day George might also calls his wife to see if the bakery where she works might have any extra items at the end of the day that she can deliver on her way home from work.

While publicizing resources and need might help streamline how food is distributed to clients, making information public carries potential burdens and accountabilities for organizations that should be taken into consideration. Supply and demand are difficult to mange: advertising resources might send too many clients to an organization while publicizing need might result in too much food.

Nevertheless, aligning supply and demand in any network involves more than simply managing a rational flow of goods and services. Publicizing an over or under abundance of resources can carry implications for how nonprofits understand, assess, and orient toward each other. Nonprofits often experience cyclical patterns of surplus of and need for food resources. However, making these patterns visible without sufficient orienting information might expose organizations to inaccurate and potentially damaging assessments of effectiveness or efficiency. Any LBIS should provide organizations (and individuals) the ability to contextualize their needs in a point in time – denoting how long they expect to have resources, why they are looking for assistance, and so on.

Control Visibility

Beyond the needs of their clients, nonprofit organizations have their own needs and experiences to consider. While all the interviewed nonprofit staff expressed a desire to serve as many clients as possible, these interviewees also expressed concerns about being overwhelmed with more requests

for aid than they are able to support. For example, concerns may arise about publicly posting location and contact information online.

"[Nonprofits] don't just publish this information ... because they're often very small they can't handle a bunch of inquiries or a bunch of new clients so they're sensitive to sharing that information."
– (Vanessa, Executive Director of a Client-Centric Food Service Nonprofit Organization)

For a nonprofit, controlling visibility is a means of communicating (or not) the availability of aid. As Vanessa's quote demonstrates, these nonprofits have a limited ability to manage unexpected influxes of clients. Because visibility of information implicitly communicates the availability of aid, information systems should allow organizations as much control over this information as possible. In addition to allowing certain information to be locally private to a particular nonprofit, finer grain controls would allow organizations to control the visibility of particular services and indicate current needs.

Returning to the profiles, imagine that Susan's nonprofit organization has joined a cross-organizational system to be easily visible to other organizations and potential clients. However, they have developed a backlog of clients and the phone has not stopped ringing. Susan has a quick strategy meeting with her volunteer coordinator where they decide to update the organization's account to indicate that partner agencies should temporarily avoid sending them new clients until things have settled down. In addition to passively informing other agencies to send clients elsewhere, Susan is also able to indicate that they could use some extra volunteer support to man the phones in order to let Susan's team focus on working through the client backlog.

Controlling visibility is especially important for smaller organizations, because these organizations could benefit the most from new technological and informational resources but may be the least able to control how new technologies impact them [Kvasny & Lee, 2011]. If improperly designed,

LBIS could, in fact, intensify disparities amongst nonprofits by designing in ways that may unintentionally preference larger nonprofits.

Document the organization's work and impact

Nonprofit organizations typically rely on private donations and grants to fund their operations. Often, as a condition for such funding, nonprofits must demonstrate how they have previously created impact in their community and the impact of any currently granted funds.

Creating accounts of impact can be quite difficult as funding sources have means of measuring impact that contrast with the nonprofit's own methods or even their overall mission. One common incongruence comes when donors and funders request "unduplicated numbers" – a count of the unique clients served by a particular donation – as a way of measuring impact of a particular program. However, nonprofit organizations typically take a holistic view of clients and may use multiple programs to assist an individual client. Here, the nonprofit prioritizes the amount of overall aid, rather than how specific donations break down in terms of number of unique individuals served.

For example, the director of a nonprofit organization running multiple concurrent programs described issues with certain types of funding requirements that do not count their assistive programs separately.

"So for us, as [a large nonprofit] we run so many different programs, how is that fair to even judge what we do like that? So we give a client an emergency box of food, but they have already been counted for the fact that they're in another supplemental program and that they're getting [name of a program] and we are assisting them with all of these other programs such as family advocacy or summer tutoring. You know this all costs money, but I can't count them. And for us, that's difficult because we need the funding. That's how we survive." – (Elizabeth, Program Director of a Low-Income Family-Oriented Nonprofit Organization)

Given that creating accounts of how nonprofits work is vital for securing funding, these findings suggest that wherever possible, design should track the particulars of how assistance is delivered. This would include client-nonprofit interactions (*i.e.,* where individuals seeking assistance are coming from; where they are going; the type of assistance delivered, etc.) and how food resources are distributed (*i.e.*, type of food; amount of food; location of service provider, etc.).

Tracking such information presents a design opportunity for collaborative LBIS to produce novel ways to represent the work and impact of different nonprofits collectively working to address a social need. For example, George, the backyard gleaner, could use such a system to track the various locations where he donates food resources. Such a system, if used collaboratively amongst nonprofits, could also give George the information to show where the people that benefit from his donations geographically live. Similarly, Susan would have an easier time accessing demographics of people served according to the various food-assistance programs and resources she matches them with.

Helping nonprofits find ways to track activities and articulate impact could enhance their ability to position themselves to potential funders and thus increase their chances of receiving funding. Of course, competition for funding can be fierce. Thus, the system must be sensitive to how information about activities can impact organizations and not presume that the system is neutral. The system should allow nonprofits to tailor not only how their activities are assessed and measured by the LBIS, but also who has access to this information. Funding pools (*e.g.*, government programs, private donors, institutions, etc.) are limited and finite resources. Unfortunately, while nonprofits may be on the same 'side' in terms of addressing a broader social need, they are often in

competition for their viability. Thus, organizations would need authority over their own data and rationalized accounts of impact.

5.5 Discussion

In this work, I am interested in designing for the ebb and flow of location information tied to time-based services and organizations that work together to address the hunger needs of their local communities. In what follows, I discuss the information complexity and density in which LBIS must engage to productively provide a platform for action.

There are a wide variety of players and technologies involved in any location-based information system (LBIS), from the databases and positioning systems, to the data entry technicians, and the consumers of the information. In terms of hunger-based LBIS, additional constraints of time (due to spoilage on the one hand and the need of the hungry on the other) and client eligibility (in terms of both governmental and non-governmental programs) add to the complexity of these data. Together these constraints create a spatial patchwork in which organizational reach and jurisdiction, hunger patterns, public transportation, food spoilage, and the physical location of food resources and organizations all overlap. In this environment, each of these components produces different spatial and temporal patterns that the staff of support organizations and their clients must navigate. Locations of food production and distribution shift, as do need and the location of hunger. Meanwhile, some assistance programs address immediate need while others set the stage for longer-term relationships.

My work aligns with prior literature understanding the concept of "place" as sites of cultural production [Harrison & Dourish, 1996] and organizational collaboration [Ciolfi *et al.*, 2008], but I

further detail what it means to understand place in terms of LBIS for hunger-based nonprofits. By physically moving through geographic space, delivering food resources, and supporting clients in person, the volunteers and staff of the nonprofit organizations I studied create places—zones within which they work—from their lived experiences that go beyond the standard views of spaces as locations within an LBIS [Harrison & Dourish, 1996].

In my analysis, these places can be characterized by their *multiplicity of purpose*, *ephemerality of resources*, and *orientation towards goals*. By *multiplicity of purpose*, I refer to how physical locations often function, depending on time and need, as sites for multiple programs and services. For example, a church may offer soup kitchen services all day, but only offer application assistance for governmental nutrition programs in the evening. Thus the articulation of information about programs and services supersedes knowledge of a specific location. Meanwhile, LBIS meant to address hunger-based nonprofits' needs, must contend with the *ephemerality of resources*. These resources include physical resources (such as food and physical space) and organizational resources (such as staff, volunteers and their program knowledge), among others. Resources may literally have a shelf life and an organization's capability to address the needs of its community is largely based on their ability to harness these constrained ephemeral resources. Lastly, these places can be understood based on their *orientation towards goals*. Places become a space where the objectives of community members and nonprofits can be addressed and fulfilled. Nonprofit workers and clients physically come together in space to transfer resources.

This incredibly complex and nuanced view of these places, however, is not being captured by current practices or information systems. The nonprofit organizations that serve the local needs of the food insecure largely rely on an assortment of paper-based and computerized information

systems, many of which use location as their key and some that are organized by other means requiring translation into locally meaningful knowledge.

Although it is tempting to imagine simply translating the information currently stored in so many different formats into a simple digital map, the kind of spatial patchwork I saw created and navigated on a daily basis requires a different approach. A digital version of the current information systems would do much to improve the scale and resolution of the data. However, such a system would still be unable to recognize the temporal nature of a need or of a resource and incapable of representing the emergent spatialities created by everyday practice.

Instead, LBIS in this context require numerous views into and across the data, at varying levels of visibility to other organizations or to clients. Such a system could then serve as a platform from which to develop new understandings of the places and spaces in the local food resource ecology. It could also become a valued communication tool to create connections amongst organizations, request or distribute resources, and create participatory or political engagements with this location-based information.

5.6 Conclusion

Coordinating donations and distribution of food resources in support of those in need requires leveraging location-based information while coordinating amongst a variety of actors. The ability to match clients with information, services, and food resources can be greatly improved through the use of an LBIS. The ability to effectively gather and distribute food resources could be similarly improved. However, the immense constraints facing under-resourced organizations with shifting

needs requires that the "location" in the LBIS represent the somewhat fragmented and patched together zones of influence and action I saw in my fieldwork.

In particular, my research indicates that the design of LBIS for these settings must include consideration of four major issues. First, these systems must support the role of the intermediary by helping these intermediaries understand the availability of potential resources. Second, an LBIS must match client needs to the available resources in order to enable them to determine client need and to direct individuals to appropriate resources—whether it be immediate food assistance or help applying for governmental services. Third, LBIS must allow individual organizations to control their organization's visibility, the places and populations they serve, and their resources. In this way, the information stored in the LBIS could make legible various pieces of information in certain ways for certain groups, and in other ways for other groups. Finally, LBIS must support accountability practices and allow organizations to document who receives services, what programs and donations contribute to each client's assistance, and how 'impact' can be measured along various dimensions.

In this work I have described the need for, and constraints of, location-based information in support of the alleviation of hunger. This work builds on an 18-month qualitative study, including the creation and testing of design considerations and a prototype LBIS. This research indicates the need to explore the notion of "location" alongside other constraints and issues in the design of LBIS, leaving open additional research to create and evaluate such a system in practice.

Chapter 6: Food Justice and Participatory Interaction Design

Determining how to investigate values in the design process is a longstanding concern within (*e.g.*, [Friedman & Nissenbaum, 1996; Le Dantec *et al.*, 2009; Winner, 1986]), and researchers are increasingly showing interest in addressing problems of moral and ethical import, such as sustainability (*e.g.*, [Blevis, 2007]), health and wellness (*e.g.*, [Purport *et al.*, 2011]), and designers' social responsibilities (*e.g.*, [Fallman, 2011; Purport *et al.*, 2011]). Another way to state this is that many designers no longer solely focus on understanding and exploring design's possibilities, they also now focus on its *obligations*. This focus on values creates new challenges for HCI designers. Prior research shows us that even when people share the same goals and values, they can be hard to operationalize in practice because there are many, often conflicting, ways to pursue a value [Voida *et al.*, 2014, Harmon & Mazmanian, 2013]. In my field work, people grapple with justice, a particular value and concept that is not only hard to operationalize, but also challenging to define and come to consensus around. Justice is a multi-faceted concept that can encompass many definitions. Even within justice-focused literature (*e.g.,* food justice scholarship, analytic philosophy, and so on), there is no single agreed upon definition. For example, distributional food justice examines how a food system's benefits and burdens are fairly shared, whereas procedural food justice focuses on how decisions within a food system are fairly made (or not). Across the board, the common thread is that justice articulates the social obligations created through our interactions with others. These obligations come to matter for the discipline of HCI as our body of researchers and practitioners collectively determine not what we can do, but what we *ought* to do. For more information about this, please see Chapter 2, Literature Review.

Despite the challenges of designing for a multi-faceted and ambiguous concept, justice moves HCI beyond the colonial impulse of designing for clearly established "good" values [Dourish & Mainwaring, 2012; Le Dantec *et al.*, 2008]. Although design is ultimately a process of making concrete and specific things [Nelson & Stolterman, 2003], and the multi-faceted and ambiguous nature of justice might seem incompatible with this, the design process can also be generative and speculative [Dune & Raby, 2013; Gaver *et al.*, 1999]. Therefore, it can provide ways for people to contend with ambiguities of concepts like justice in novel and reflective ways. By examining how we, as designers, understand and orient towards justice in our own projects, we can produce more robust theoretical contributions focused on the capacity and constraints of various sociotechnical interventions addressing social inequality.

In this work, I explore design as a participatory process in a way that is amenable to justice's multi-faceted nature and that leverages the generative and speculative nature of the design process. Based on this work, I develop a framework for designers to render visible assumptions about social justice. Next, I briefly explain how I developed design activities to examine concepts of justice in the design process. Please see Chapter 3, Methods, for additional details. In this research, I employed a semi-structured design process that allowed me to introduce concepts of justice in order to facilitate conversations and design work (*e.g.*, understanding the problem, brainstorming, and so on). I introduced concepts of justice through design activities tailored to each group's needs and goals. This process allowed for emergent, complex, and multi-faceted ideas about design and justice to emerge during the design process. I derived concepts of justice from prior literature to create prompts and design activities for participatory design sessions. In my analysis, I examined the process (*e.g.*, how people did or did not situate the concepts of justice in their own experience during discussions, how decisions were made) and the output (*e.g.*, design decisions, artifacts).

After analyzing a series of workshops about designing for justice, I present a framework aimed to help designers articulate what they mean by social justice in their projects. This framework suggests a series of key design questions that designers can ask themselves in order to interrogate how different definitions of social justice come into play during their design process, thereby rendering visible their own assumptions about justice. In so doing, this work provides a way for designers to add rigor, reflection, and deliberate action into their social-justice oriented design practice. By making these choices visible and bringing them to their attention, such a process can help designers actively reflect on these concepts and make more informed and explicit choices. My analysis of the workshop discussions highlights three points within the design process where decisions about justice are made. These key sites of decision making include the points in the design process when participants are *framing social issues, envisioning impact,* and *assessing possibility.* At each of these points in the design process, there are multiple reasonable future trajectories of the project. Decisions made at these points will ultimately have consequences for the project and greatly influence the kinds of interventions imagined. At each of these three points, then, there is an opportunity to incorporate different perspectives on social justice, and to make visible the implicit ideas about justice that inform these decisions. Stopping to reflect at these points in the design process can draw attention to the ways that participants situate concepts of justice in their own experiences, situations, and opportunities. At each of these points, the following questions can be asked:

- **Framing social issues:** How is the problem understood?
- **Envisioning impact**: How and what impact is possible?
- **Assessing possibility**: What resources are available to develop impact?

In my analysis of these design decision categories, I find that each has multiple reasonable pursuits and incorporates different social justice perspectives. For example, within the category of *framing social issues*, I examine how framing social issues happens along a continuum of individual and society-centric perspectives. Then, I demonstrate implications for taking on these justice-related different perspectives and approaches. Designers can choose a variety of multiple, reasonable approaches in their own work, but should be aware of their choices, what they imply, and what they leave out during their design processes. The analysis of these design decisions highlights the multiple reasonable ways of addressing social issues. A way to make more informed and deliberate choices is to pay attention to these key design decisions in our own practice.

In this work, I focus on design as a speculative, projective activity. Thus, I do not take the perspective of design as implementation, or as an examination of objects in practice. Rather, in this work, design elicits the ways in which people situate these concepts in their own experience and assess what is possible for making inroads into complex social issues. This work provides guidance for designers to reflexively understand how various concepts of justice may play a role within their work. These questions present a method for designers to add additional rigor and reflection into their social justice-oriented design processes by helping designers articulate to themselves and others what they mean by social justice in their projects. The remainder of the chapter will explore these design decision categories using empirical data from my design workshops. I will conclude with implications for design practice.

6.1 Key Design Decisions

In this section, I unpack three design decision categories. After each design category, I articulate related questions, which are meant to provide guidance for designers to reflexively understand how

various justice concepts may play a role within their work. In these sections, I anchor these decisions' implications in contemporary HCI design practice. When I refer to the design workshop participants, I call them "workshop participants." When I refer to UX and HCI designers and scholars or design as a professional practice, I refer to them as designers.

6.1.1 Framing Social Issues

Given that there are many ways to understand a situation, designers develop problem frames to help them understand complex social issues. Design practitioners and researchers often use problem frames to understand the same social phenomenon or problem at various scale and scope, which greatly enables and constrains the corresponding imaginable design spaces [DiSalvo *et al.*, 2010, Kolko 2006]. For example, two different designers might look at the same problem domain (*e.g.*, conserving water) and come up with varying design spaces that lead to radically different interventions. Framing problems within the design process can be difficult, because many reasonable problem frames exist. Within complex social issues, there is no single root cause, but rather a myriad of interconnected conditions that perpetuate and exacerbate social issues [Baumer & Silberman, 2011]. For hunger, there are many reasons why people may be food insecure (*e.g.,* poor health, job access, transportation, education, etc.); the constellation of these conditions exacerbates poor living conditions.

In what follows, I articulate different ways of framing social issues and their relationship to the design process. I then explore questions that will help a designer disentangle key concerns related to framing a social justice problem. Such an analytical process can help a designer develop frames that demonstrate relationships between immediate needs and social inequalities, which can then render choices and decisions explicit. Analytically approaching a design space is a key step in

problem framing when the designer must elect where and how to best apply their resources, time, and skills towards a particular problem. By disentangling key concerns, designers then craft more targeted interventions to address their participants' specific concerns and goals.

In the design process, designers articulate their perspective (or framings) of issues as more or less *societal* or *individual* through their discussions of matters of concern. One way to talk about individual perspectives is to talk about an individual's immediate material needs, whereas a way to talk about societal perspectives is to talk about social inequality. By need in this context, I refer to the manifestation of a particular detrimental material conditions (*e.g.*, lack of sufficient amounts of food, housing, education, or employment opportunities, and so on), whereas by social inequality, I refer to structural conditions that perpetuate circumstances for a need to exist and to become disproportionality pervasive for a particular community, usually based on gender, race, class, or socioeconomic status. For example, while hunger or food insecurity is an immediate need experienced by an individual, the social inequality wherein hunger or food insecurity arises relates to the societal structures that create conditions for a need to exist. These structural conditions include unequal access to fresh and nutritious foods (*e.g.*, food deserts), or the ability to purchase those food items (*e.g.*, unequal access to job or education opportunities).

Designers often blur the lines between multiple topics and incorporate multiple scales. One way to understand the relation between these framings of immediate needs and social inequalities is that needs often do not have a singular root cause; in fact, these needs and inequalities often stem from multiple types of social inequality [Rittel & Webber, 1973; Crenshaw, 1983; Baumer & Silberman, 2011] that result in unequal experiences, circumstances, and opportunities. By multiple types of social inequality, I refer to the ways in which social inequalities intersect within class, race, gender,

ability, and so on to amplify and exacerbate issues. Other scholars call large, complex social issues "wicked problems." For example, Kolko states that, "not all hard-to-solve problems are wicked, only those with an indeterminate scope and scale. So most social problems—such as inequality, political instability, death, disease, or famine—are wicked" [Kolko, 2014].

Needs stemming from social inequality are often multiple, complex, and interrelate with other conditions [*e.g.*, Crenshaw, 1983]; therefore, designers may need to address multiple needs. In selecting where and how to produce an intervention, designers may not always address underlying social inequalities. For example, a designer could create a system to better feed a hungry person that does not necessarily address the food desert in which that individual lives. When the underlying challenges are ignored, solutions naturally tend to be insufficient stopgap measures, which may create barriers to more sufficient programs, without providing adequate provision for the need [Poppendieck, 1998].

In my research, workshop participants framed food equity concerns as individual deficits (*e.g.*, lack of education or individual knowledge or awareness), structural inequality (*e.g.*, an unequal food system), or both. Such perspectives greatly influenced the category of interventions imagined. For example, orienting towards food issues as a problem stemming from individual-centered deficits (*e.g.*, not enough individual access to food) led to technologies that focused on better charity-based distributions of food resources (*e.g.*, a map of food resources). On the other hand, situating problems as a structural inequality led to systems that disrupt the power structures within social relationships (*e.g.*, an online market system that aimed to level the playing field between urban farmers and high-end consumers/purchasers). I will discuss these in turn.

Framing Social Issues: Immediate Needs

Within the context of this work, immediate needs refer to the manifestation of a particular detrimental and immediately pressing material condition(s) for an individual (*e.g.*, lack of sufficient nutrition or hunger, lack of sufficient housing, education, or employment opportunities, and so on) . Within the design workshops, participants articulated and rendered visible notions of need when their discussions focused on hunger, nutrition education, or insufficient food or types of foods (*e.g.*, nutrition). While structural inequalities might be mentioned, such as food deserts, often the conversations focused on people's experiences of those structural issues, or how to help people contend with those experiences and needs. This included discussions on nutritional education and sometimes framed aspects of people's lives or character as deficits (*e.g.*, a person having a lack of knowledge; or a person who was unable to make "good" choices regarding personal finances or food economics, and so on). The design focus was not to change structural inequalities from the "top-down," but instead to help individuals develop the necessary resources, skills, and knowledge in order to deal with the experiences of those inequalities.

When workshop participants focused their attention on hunger as an individual's urgent material need, such as not having enough food in a household, participants tended to address the problem in two ways. First, they typically envisioned new technologies to support better charity-based food distributions. Second, participants envisioned new methods to assist people in access to and use of resources, skills, and knowledge. Many of these groups emphasized the role of food charity nonprofit organizations in providing support for these individuals to contend with hunger.

These individual-focused discussions highlighted concerns about the capacity to engage with food, including: food-related health concerns, cooking ability, procuring food, and how community

members experience a food system. One such concern was the relationship between food choices and health. Conversations across different workshop groups focused on how certain food choices were out of reach for community members because the cost of fresh produce was prohibitive, physical access to stores with high-quality produce was difficult, and the selection for some grocery stores was limited. For example, group B focused on creating a new mobile system to track an incentive program that subsidized the purchase of fresh produce. Participants articulated direct links between their design outcomes and food choices: how people would be able to make "healthier" food choices. Here, Allison discusses how the ability to purchase fresh produce at a reduced cost can enable one to "eat more healthy," since workshop participants often remarked on how fresh produce was perceived as expensive compared to other foods (*e.g.*, other food items that have a much longer shelf life).

"That would be good because now then you are actually buying more vegetables and the same time you are saving because you are getting incentives for buying the vegetables … but it can keep you buying more vegetables and help you eat more healthy" – (Allison, food stamp recipient, mother, works for a local university, Group B)

A different workshop group, Group C, focused on creating a new system that brought together many different stakeholders in such a way that could help people access better food. The envisioned system joined multiple stakeholders to develop a new food distribution system, connecting community members with farmers and grocery stores. At the center of this system was a Chief Food Officer (CFO), who manages customers' orders and connects with those food venders. The proposed information system comprised an ordering system that could help this new type of person collect and manage orders, customers, and food vendors, including food banks and grocery stores. While the proposed intervention took the form of an inter-organizational system, the frame and site of the underlying issues they attempted to address resided with individuals and their urgent food needs.

One of the core requirements participants outlined for any system's design was inclusivity, allowing access for many different abilities. Participants selected a multi-modal service system (*e.g.*, using a phone-based and online-based ordering system) rather than just an online-only approach. These participants wanted to be as inclusive as possible to expand the system's potential impact. Early on, however, there were some disagreements about how to approach the problem. In group C, some participants wanted to focus on improving community members' farming skill sets, but other participants disagreed with this approach. We can see here that even when people share the same problem frame (*i.e.*, immediate, individual needs), participants may disagree on how to go about addressing the situation.

"Now you are a farmer, so you can do that. But for someone who is not a farmer and does not know about food, [they] would be left in a situation where they have no solution!" - George, Community Food-Focused Nonprofit Manager, Group C

The core of the disagreement focused on what was deemed a *reasonable expectation* for a community member in terms of assumed skill sets and resources, including time and access to land fit for food production. A common issue was that much of the underdeveloped land that could theoretically be used for urban farming is polluted, and would be very expensive to decontaminate. Eventually, the group decided to focus on developing a new food delivery system. Not only were participants thinking through skill sets and resources, but workshop participants also discussed people's experience of living in a food desert.

George, Community Food-Focused Nonprofit Manager, Group C: I want to say something about that ... why do people travel to get food? why do you think they will go to the [names grocery stores that are farther away], but they don't go to the grocery stores in their neighborhoods?

Olivia, NPO worker: I guess they think the quality is better at the other stores.

George: They say because when they go to those other stores there is not a consistency in enough of the things they need. We don't want to travel so far and then every week [and not be able to purchase the things came for] ... and I'm not talking about the seasonal items. We need create the system of

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consistency. People should feel like with the organizer that they know they can go and pick up what they need. Then they call the organizer and they [the organizer] get[s] that in stock."

In response to this perceived patchwork availability, wherein community members report unpredictable food availability, these workshop participants sought to improve experiences of living in a food desert by contending with consistency. In their ideal design, the CFO should manage community member requested food orders. These conversations highlight how the workshop participants framed the experiential phenomenon of living in food deserts, which then impacted how they designed the system in light of their perceptions.

A focus on *immediate needs* provides several insights. These data suggest that when designers focused on individual immediate needs, they tended to envision systems that helped people ensure access or develop competencies with resources, skills, and knowledge. Many of these systems relied on existing charity-based food distributions. Orienting towards food issues as a problem stemming from urgent needs or individual-centered deficits (*e.g.*, not enough individual access to food), led to technologies that focused on better charity-based food resource distributions (*e.g.*, a map of food resources). The workshop groups that focused on individual deficits tended to put forth design ideas that viewed the individual as the source of the problem, and therefore focused on the individual to address the problem. Indeed, if one approaches the problem as an individual immediate material need, it is logical to focus attention on the individual.

There are benefits and drawbacks to individualistically framing social issues. When design attends to immediate needs, it can potentially alleviate those individual issues. Also, individual-centered designs tend to focus on building individual human capacity through education [Sen, 2011], which sets the stage for longer term benefits. Yet, there are significant drawbacks to focusing on urgent needs rather than long-term or systemic needs. An individual-centric frame may overestimate an

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individual's ability to contend with a social issue's circumstances, and thus overlook productive alternatives [Dourish, 2010; Håkansson & Sengers, 2013]. For example, an overemphasis on individuals may miscategorize the issues at hand and miss, or even undermine, opportunities for collective action. Additionally, there may be important steps, such as policy issues, that should be addressed, but are overlooked when focusing on immediate needs.

Framing Social Issues: Structural Inequality

Structural inequality refers to the ways in which various societal structures (*e.g.*, institutions, laws, policies, social opportunities, etc.) may unequally advantage and disadvantage groups within a social food system (*e.g.*, access to food resources, exposure to pesticides, etc.). For example, certain policies may hinder a smaller organization's ability to sell or distribute food. A food system comprises all of the activities, people, and infrastructure necessary to feed a population, including growing, harvesting, transporting, consuming, and so on [Hinrichs, 2003]. By social food system, I refer to a food system that takes into account not just the various rules, resources, and interconnected pathways that create the food delivery system, but also the how various social conditions impact a person's access, use, or experience of that food system.

Within the design workshops, notions of structural inequality manifested through discussions of food ecosystems and regulations. Workshop Group A focused on designing an online market system that aimed to level the playing field between urban farmers and high-end consumers. Their discussions were often framed in terms of food systems and ecologies. Participants articulated the interconnections among the different dimensions that they believed were contributing to negative food-related outcomes (*e.g.*, pollution's impact on their ability to produce healthy food). Discussions frequently referenced big agricultural organizations (*i.e.*, commonly known as "big agri").

Participants compared differing ways of farming (*e.g.*, urban vs. big agricultural farms, and so on) or organizations to work and unequal access to resources such as funding. While working through their understanding of the issues, one of the workshop participants prompted that perhaps the major issue is that urban farmers need to focus their attention not only on growing and stewarding the land, but also on creating beneficial food markets.

"How do we create a market for what everyone is growing? Everyone [local urban farmers] is focused on growing, but people are less clear on how we create a market out of this food." – (Victor, Group A, Urban Farmer, connect to community food-focused nonprofit organizations)

By referencing large markets, participants framed concerns as larger than individuals, pointing to structural constraints. By "market," the participant references both a traditional marketplace where a person can sell products, as well as consumer demand. These participants were motivated to create an online marketplace by restrictive regulations that impeded their ability to sell their locally grown produce in their neighborhoods.

"… the city is regulating people out of business while the County is trying to boost corner store initiatives!" – (Paul, Group A, Urban Farmer & Pastor)

Here, Paul speaks to his and others' frustrations with the County and local city regulations working in opposition to each other. Beyond legal complications, other barriers to selling locally were discussed, including the lack of funding and/or external support. In this group, participants struggled with earning a living wage from urban farming, commenting that not all nonprofit organizations are treated equally or have equal opportunities.

"Certain groups have access to resources and then there is an unequal distribution of those resources. It becomes funneled into big groups like the [names local larger nonprofit organizations and food enterprises, such as a food bank], and less dispersement among other community organizations, like access to start up capital." – (Allen, Group A, Manager at a local food, community, and education-focused nonprofit organization)

"Also a strong board, many [nonprofit] boards are filled with nice people, but [successful nonprofit food organizations] have boards that are strong, not because they are nice people but [because those] individuals are well connected" – (Ralph, Group A, connected to multiple food and hunger-focused nonprofit organizations focused on local food and local people)

The organizational inequalities that pervade the nonprofit ecosystem can make it difficult for

various nonprofit organizations to provide for their local communities. These difficulties include

having enough (or the right) staff to meet their goals, receiving less funding or grants than their

peers, or even experiencing issues with access to and use of information and technology. This

suggests that these organizations experience similar inequalities in terms of access to resources

when serving and responding to community needs [Kvasny & Lee, 2011]. Nonprofit organizational

workers and urban farmers then turn to alternative methods to do their work of taking care of

people and the community.

"The other question is, is it appropriate for us to just think of food as only nonprofit? What would it be like if the paradigm shifted to make a profit? That you organize and structure so that you can take care of people and feed them and provide them with a clear service and product and still have the funds to be able to ensure you give a client a wholesome product." – (Ralph, Group A, connected to multiple nonprofit organizations focused on local food and local people)

(A strong yes from others in the group.)

"What is the best way to make a million dollars in agriculture? You start with two million. It is a very intense endeavor to get into and make a profit, it can be done, there are models out there." – (Allen, Group A, Manager at a local food, community, and education-focused nonprofit organization)

"We say nonprofit but looking for grants limits you. We got someone who got a $100k grant, but those are far and few … look at Will Allen from Detroit [a famous urban farmer and food advocate]. " – (Ralph, Group A, connected to multiple nonprofit organizations focused on local food)

"… the [proposal of the] food commons is attractive because it has an economic component and you gotta eat. There are responsibilities you have for your family. You gotta be able to handle it there is a need for food like this 15 years." – (Ralph, Group A, connected to multiple nonprofit organizations focused on local food)

Organizing and planning to contend with structural inequality is a demanding task, which is often

complicated by insufficient resources and policies that do not reflect neighborhoods' on-the-ground

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realities. To deal with those demands, workshop participants designed an online marketplace to foster local market demand for locally produced agriculture. The proposed system was based on a pro-community food economic model, which shapes business practices by focusing on principles that emphasize creating a food system that supports local communities [Yee, 2015]. This was done in opposition to economic systems that were viewed as purely "capitalist" and did not take into account, at the forefront, the welfare of the entire food system, including workers and local communities.

Using a structural perspective produced several insights. These data suggest that groups who focused on structural inequality created designs aimed at reconfiguring social relationships. Here, the reconfiguration was aimed at the relationship between urban farmers and high-end business consumers to help foster demand for locally grown produce. Given how needs manifest, a focus on design as a method of rearranging social relations may be a productive avenue for approaching design for social change. The implication is that designers focused on complex social issues should not only address immediate needs, but also seek to intervene in the complex situations that produce those needs. These data show that a structural perspective takes into account these social relationships and how they could be rethought to foster social change. These insights lead us to questions that may be useful during the design process, which I will discuss at the end of this section.

Key Questions for Framing Social Issues
These questions stem from the analysis of how participants framed social issues both as immediate needs and structural inequalities. Addressed to designers, the questions help designers identify and reflect on how they understand and frame social issues within their own design projects, and thus

may help them disentangle key concepts and decisions in relation to their social justice projects. When I use pronouns within the following text, I refer to professional designers.

Key Question: What is the scale of your problem frame? Is your problem frame located at the scale of the individual and their immediate needs, or does it take a higher-level perspective that looks at connected social inequalities? Does it focus only on one and scope the other out of bounds?

Within design theory, problem frames are useful subjective constructs for designers that help them understand, situate, and design for complex conditions [Kolko, 2010]. Problem frames help establish the boundaries of, and articulate the conditions for, addressing a particular problem space. Different problem frames can exist at different resolutions, by which I mean how the problem is framed, including under what conditions does the problem exist, and for whom is it a problem. Thus, designers may do well to explore multiple resolutions within their design explorations. For example, in a design project seeking to assist with food insecurity, one could imagine projects in which designers focus on individual deficits (*e.g.*, food preparation knowledge) or instead on societal deficits (*e.g.*, the logistics of how food deserts form).

Given social issues' severity and diversity, we need a multiplicity of interventions to contend with both large scale social problems and local needs. There are several benefits to exploring different kinds of resolutions in a design process, and such explorations will help illuminate tradeoffs between multiple pursuits. Exploring diverse scales as a way to understand problem frames will provide designers with the capacity to see the world as malleable and susceptible to change. While this is not unique to social justice-oriented design work, given the entrenchment of social problems malleable perception is an essential component for imagining possible, more equitable futures.

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Another way to frame social issues is through their relationship to time and time frames. Rarely do the timeframes of need and the conditions that perpetuate those needs well align. Frequently, need (*e.g.*, hunger or food insecurity) is "immediate." For example, community members may physically run out of enough food for their household within one to three days. Nonprofit staff I have worked with typically referred to this as "emergency" need. Likewise, the conditions that perpetuate those needs (*e.g.*, a dearth of food access within a neighborhood; a lack of adequate education or adequate paying jobs, institutional racism, etc.), tend to have a deep history, connected with activities and decisions far beyond the site of the expressed need, and usually including the disenfranchisement of a particular population based on race, gender, class, etc. Further, organizations who respond to these needs must themselves deal with cyclical timeframes of resource surplus and deficit. Many community partners have vented to me their frustrations that the winter holiday season (*i.e.*, November through December) is their most productive time for all types of donations, but that it is challenging that the large community does not understand that "need has no season." Given these mismatches, designers would do well to explore how these timeframes relate, and how design may be able to address both the immediate needs (*e.g.*, individual malnutrition) and the social conditions that perpetuate those needs (*e.g.*, regional food scarcity or food deserts). Within an HCI design process, this means exploring not just the identified need, but also how and why that need exists, and how design might be able to work towards addressing those underlying conditions.

While immediate needs are urgent issues to be dealt with, design can also productively engage in addressing the longer-term concerns and conditions producing those inequalities. Asking how a design project explores or engages in multiple time scales (and time resolutions) will thus help

designers understand if and how their approach contends with immediate needs, and whether they can also work to change the conditions so a need no longer exists.

6.1.2 Envisioning Impact

In the last section, we highlighted how participants' framing of problems impacted their design choices. Here, this analysis focuses on how and where participants envisioned possible change, and how an imagined system could bring about that change. In this section, I focus on how and where participants envisioned impact, either in their lives or in the greater food system. Impact is about what participants articulate as likely avenues for influence and control; and by control I refer to the ability or capacity to impact change in circumstances. Within human-centered design, this opens up questions of who has control (over what information, practices, visibilities, data, and so on), what is enabled via these new information streams, and in what contexts do practices take place. Within the workshops, all systems proposed by participants imagined different ways of understanding and designing control into those systems to enact change. By embedded, I refer to how design decisions may inscribe different ways of designing for control, or ability to enact change in circumstances. Here, design is predominately a future-oriented activity that no longer purely focuses on situational analysis, but rather on what participants articulate as possible, and what they desire for change.

In my data, I saw two ways of thinking about *envisioning impact*: an individual-centric perspective that sought to *expand options and flexibility* for individuals, and a system-centric perspective that sought to expand the *capacity for influence* on the food system. When participants expressed individual-centric notions of control, a recurring (and pragmatic) assumption was that increasing the flexibility around how to use a system and service (for even relatively small choices) might improve these programs' utility. In the workshops, participants were better able to imagine how

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these programs could fit their needs and circumstances. Here, the emphasis was on giving the individual a wide range of choice in how and when to use a system. In these individual-centric approaches, systems and tools are (re-)envisioned in terms of enabling more choices for food insecure individuals in their own lives, which is important given that many assistive programs tend to be paternalistic (Poppendieck, 1998; Piven & Cloward, 1993; Chappell, 2010). An expansion of choice is viewed as beneficial in that it gives individuals new methods for addressing their daily circumstances and experiences. By contrast, when participants expressed system-centric notions of *envisioning impact,* they expressed desires to build capacity for influence within a food system. Participants envisioned systems that helped them collectively act to create larger impact, wherein they focused on how the aggregation of small, but united, individual actions may lead to larger changes. Within the "Building Capacity for Influence" section below, I demonstrate how people envisioned improving their own capacity to enact change in the larger social food system. I will discuss each in turn.

Envisioning impact: Expanding Options and Flexibility

Within interventionist HCI, a common design goal is to build on currently existing resources and capacities in ways that produce better outcomes in people's living and working conditions. This type of work attempts to empower individuals by enabling better access to and use of information and technology. Human capacity is fostered by creating platforms of participation and self-determination, where control concerns an individual's agency within their own circumstances.

Both in my data and in the broader interventionist HCI literature, one way to embed control is through an individual-centric approach that seeks to expand choices [*e.g.*, Kleine, 2009; Boettiger, Toyama, & Abed, 2012]. By expanding choice, I refer to, at a high level, the different ways design

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decisions imagine tailoring available food options for food insecure individuals to work towards their goals (*i.e.*, creating more choices for an individual at a grocery store). The idea of expanding choice refers to both an expansion in the number of options available to a person, as well as inscribed flexibility of how to engage with a system. Within the workshops, participants tended to advocate heavily for the "user" to be presented with multiple avenues in how to use services and information. Such imagined flexibility then allowed these individuals to better envision how they could adapt these systems and services to their own circumstances.

Workshop participants tended to support increasing the flexibility of how choices were inscribed into the proposed information systems. Group B focused on how to design the mobile application component of an experimental pilot program for the supplemental nutrition assistance program (SNAP). They imagined developing an application that would allow users to purchase more produce by taking advantage of a pilot federal program, Healthy Incentives Pilot from the United States Department of Agriculture's Food and Nutrition Service. It aims to "determine if incentives provided to SNAP recipients at the point-of-sale increase the purchase of fruits, vegetables or other healthful foods" [Bartlett *et al.*, 2014]. The pilot program works by giving participants bonuses when they purchase fresh produce, which could then be used to subsidize the produce's cost. For every $10 they would spend on fresh produce, they would receive an additional $10 to spend on produce. Here, the pilot nutrition program itself expands choice for individuals who participate in SNAP. Participants wanted to design a mobile application system that would help people using the pilot program to better track their bonuses and other useful program information. Later, in this section's summary, I will articulate the intrinsic tradeoffs between choice and constraint, and how expanding choice comes through constraints.

Given that fresh produce can be difficult and costly to obtain for those living in food deserts [Algert *et al.*, 2006], the pilot program sought to reduce potential barriers to fresh produce. The mobile application component proposed by group B would have given pilot program participants an additional avenue in which to participate by tracking their current bonuses, finding information on which stores participated, etc. Initially, one of the lead participants suggested that the program could be focused on "Georgia Grown," a program that labels Georgia-specific products, as that could be a big selling point for funders. However, this suggestion was met with objections from other participants. Workshop participants from the community and who participate in SNAP reacted negatively to the potential restrictions that would accompany Georgia Grown, since only being able to use Georgia-specific products would have greatly reduced their ability to purchase produce. Georgia has a limited growing season and produce options; therefore, a Georgia-only produce restriction would have severely constrained the participants. Here, we can see participants advocating for the program to be as expansive as possible.

Researcher: So, earlier we talked about the different kinds of produce that could work for this incentive program. Those differences being Georgia Grown produce and other produce, but I don't think we came to consensus.

Allison & Lilly: Yes, for all produce!

Allison: I'll be honest, I'm not a fan of only Georgia grown. Most [of] our fruits are things that are NOT grown in Georgia. So, if it could be for all [fresh produce] and at the same time, help me get something grown from Georgia because they are more [expensive] then ... yeah.

[Other workshop participants murmur in agreement]

Here, the rationale for not wanting only Georgia-specific produce is based on the restrictions it places on participants' options. In the following exchange, we see participants advocate for flexibility in how and when the bonus incentive should be available:

Rebecca: It depends. If it's in real time, then if you spent $20 you'd get the $10 off instantly. If its one where you can bank it, then maybe there is something on the app that says, "I want to use now". I still purchased $20 in vegetables, and then you could say i want to use so much of my incentive for this

purchase. Then [for the day's] purchase items you could decide what portion of it you'd like to use. Or if every time you'd spend $20 [on produce] it takes $10 off. Or maybe if you had $10 worth of vegetables, you get $5 back.

Lilly & Allison: Yes!

Lilly: I'd rather have the option to choose how much [of the incentive to apply].

Allison: Yes, instead of this automatically taking the whole thing off.

Researcher: What makes it desirable to be able to choose whether or not if it comes off of this bill or the next?

Lilly: Maybe I don't wanna to buy $20 worth of fruits and vegetables, maybe I just need $5. Sometimes when I go shopping, I'll shop for the month and sometimes I might need something or I might want to cook something special or just a particular meal.

Here, Lilly strongly advocates for the possibility of when and how to use the program to suit her needs. Later, Lilly discusses how such a program could be useful for her during the holidays if it let her "build up" her incentive over the course of the year so that she can then splurge for the festivals. Lilly projects into the future how she would like to use this application and when it could be made to be more useful for her. Although food is necessary to sustain life and bodily functions, it also has celebratory and cultural significance [Counihan & Van Esterik, 2013; Casotti, 2006]. Currently, many nutrition programs focus on food to support bodily functions, but not necessarily to support the cultural significance of food (*e.g.*, a birthday cake, or special holiday meals like baked ham or roasted sweet potato). By designing a service that enables participants to build up their incentives (rather than using them right away), the women in this particular workshop were able to better envision how such a program might help them purchase items that may normally exceed their budget with the traditional SNAP program. This enabled the workshop participants to envision how they could get their "black-eyed peas on" during such celebratory events.

I observed these design strategies envisioning expanded individual choice across multiple workshops. For example, in Group C, participants focused on creating a new food distribution

system to connect community members with farmers and grocery stores. When asked about the potential benefits of the proposed system, workshop participants discussed how the system would enable better food access. They envisioned this system as a possible platform for change that helps create new ways to improve assistance to food resources.

"This [proposed] system will be choice-oriented and demand-oriented, and so it will contribute to self-determination, and it will in fact regulate the system around them to help them get what they need, rather than what the system gives them." – (George, Community Food-Focused Nonprofit Manager, Group C)

Here, system refers to food systems. The food system did not meet the demands of lower-income communities in terms of food quality, selection, or availability. Workshop participants envisioned a system responsive to each community member's desires and needs. This imagined alternative system worked within the current food system to help community members access food resources. Here, the desired outcome was to provide more availability and food options, given that food insecure seniors considered the current food system to be rather limiting.

Increasing the flexibility around how to use a system improves these programs' utility by making them more adaptable to individuals' circumstances. This envisioned flexibility allowed individuals to envision choosing when and how to use a service to meet their own personal circumstances and needs. Increasing flexibility as a design strategy directly opposes a policy trend that seeks to restrict the use and adaptation of governmental services for low-income populations [Dolan & Carr, 2015].

I argue that design strategies aimed at increasing the flexibility of engagement are a type of implicit coping strategy that individuals use in response to the lack of adequate nutrition programs and food access within their food systems. Within this work, nutrition programs simultaneously offer people food and nutrition assistance, but those programs are often highly restrictive. Therefore,

these participants are trying to respond to these less-than-ideal circumstances by imagining "users" who have just a little bit more control over how they engage with systems and services.

Envisioning Impact: Building Capacity to Influence

In this section, envisioning impact is not about individuals, but rather their relationships to the larger food system and how to change it. Here, participants sought to change perceived power dynamics within the food system. Thus, in this section, impact describes how these participants envisioned collective practices that could *build the capacity to influence* the larger power dynamics within the food system. These envisioned collective actions focused on the aggregation of small actions over time that create the potential for larger system changes. The larger impact was envisioned through building capacity to influence other stakeholders, and to engender different kinds of relationships. I discuss how this capacity for influence was the focus of some groups and their designs. By influence, I refer to how certain design decisions worked towards shifting the gaze of other stakeholders to help engender the possibility of change within the food system. This type of change work could be viewed as externally-focused, given that these workshop participants wanted to change the food system in a way that would foster more evenly distributed decision-making.

Group A focused on envisioning a new food market to achieve more equitably shared control of the food system with those who are impacted by decisions about it. One person in the group, Victor, had a particularly strong vision aligned with The Food Commons, and discussed their overarching ethos. The Food Commons website states that their work seeks to "leverage, support and enhance existing and emerging regional food system initiatives to offer the American public a wide range of benefits that may not be as widely distributed in our current food system" [Yee, 2015]. Here, Victor

discusses how enacting a food commons will lead to more distributed decision-making within the food system.

"The theory is that … [a different type of food system] would create a spine, an environment that would produce an economy that produces more jobs, better quality food, and better democracy, because it would be a community-decision making process … as opposed to just private enterprise who make decisions solely out of profit." – (Victor, Group A, Urban Farmer and "not for profit" Food Entrepreneur)

Victor contrasted the goals and vision of The Food Commons' vision with the current food system and its privileging larger agricultural endeavors. Later in the design process, Victor acknowledged that other pre-existing marketplaces would, on the surface, meet the group's goals, but stated that the existing online marketplaces were "capitalist" and therefore did not align with the values of a food commons. Typically, online food markets focus on competition and national distribution. Group A envisioned a smaller, more local food system where urban farmers could grow and sell locally, as compared to big agriculture where labor and product are separate from the local community. In this group, workshop participants felt many of their values were not represented in the current capitalist food system, including fair labor practices, transparent financial accountability, and commitments to supporting local businesses. An open question they struggled with was how to get other people who did not share their views to invest and participate in this alternative food system. This is a reasonable question, given that these views are not just different, but actively oppose each other.

Given that substantial changes take a long time, possibly beyond an individual's life span, this group focused their design efforts on areas where they might see shorter-term benefits (*i.e.*, within the next few years), while simultaneously positioning their group to make longer-term changes. By establishing a food market, they would be able to sell their products and create mutually beneficial

exchanges between themselves and high-end consumers. The group's examples of high-end business consumers included artisan markets, food trucks, caterers, and restaurants. The group picked these groups because they stated that these types of consumers would be motivated to purchase local, and may be more flexible in how they purchase their produce.

These urban farmers have relatively low positions of power or social influence within their current food system, hence their positioning toward future influence. Creating a marketplace such as the one they envisioned could help create broader influence in two ways. First, they would be able to sell beyond their neighborhoods, reaching the broader Atlanta community and fostering relationship bridges with people outside of their neighborhoods (Putnam, 2000). Currently, many of the urban farmers were only growing for themselves, or were only able to sell within their own neighborhoods. However, they realized that the problems they were addressing extended beyond their own neighborhoods, and aspired to further their reach. Sam, an urban farmer and co-manager of a religious nonprofit organization, stated, "I plan on working with more than just one community, because we have a lot of food deserts."

Second, this design would position the urban farmers to work directly with higher-end business consumers. This design strategy seeks to influence the greater food system by directing the gaze of other stakeholders. Conversations in this group focused on presentation and representation to others. Pat, an urban farmer and master gardener stated, "people eat with their eyes," during a discussion of how to curate representations of food and farmer. These stakeholders desired to be seen as professional and legitimate, and an online food marketplace could help them shape other stakeholders' gazes.

Participants envisioned systems that would influence the larger food system. In these cases, ideas around control focused on how the aggregation of interactions may lead to larger changes as they play out over time. People did not just want influence over themselves, but over the greater food system.

Key Questions for Envisioning Impact

Addressed directly to designers, the proceeding questions can help a designer identify and understand various forms of envisioning impact by enabling them to disentangle key concepts and decisions in relation to their social justice projects. Further, these questions aim to help designers examine how they understand their work's possible impact. When I use pronouns within the following text, I refer to professional designers.

Key Question: How is social change possible? Where are the speculated sites of intervention? How are designers creating capacity for the oppressed to impact their own lives and the larger social food system?

Designing for social change is complicated for social issues that involve immediate human needs. Prior literature focuses on creating change for social issues; notably, sustainability literature recently advocated for system-centric interventions (*e.g.*, [DiSalvo *et al.*, 2010; Dourish, 2010]) over individual-centric interventions (*e.g.*, persuasive behavior change). However, an approach that only incorporates system-centric interventions does not translate well to social issues like hunger. Hunger, as a social issue, has both systemic concerns as well as immediate needs that must be addressed. Immediate needs such as hunger and the social and health and well-being of individuals who are food insecure must be tackled, because human beings need to eat and we do not want to perpetuate human suffering. However, to only address immediate needs, and neglect the systemic

issues, is a failed recipe for long-term social change. The systemic conditions that perpetuate and give rise to hunger must also be addressed (*e.g.*, ill-fitting public policies, food deserts), otherwise people will experience hunger in perpetuity. While they did do not need to occur within the same design project, designers ought to develop design strategies to tackle both immediate needs and systemic concerns.

As noted earlier, designers have limited resources in which to engender change or create impact. Rather than solely focusing on technical change, I argue that designers ought to focus on social change or interventions that seek to reconfigure the social relationships that produce social inequalities. Such interventions could happen in a variety of ways and have many potential benefits, including creating the capacity for an individual to directly impact their own life or the larger social food system. These questions also ask, "how do you change the power dynamics within a relationship?" Money and politics seems to be the short answer. In Group A, we saw people envisioning a different economic relationship with others for the potential to shift the dynamics between the two. Similarly, you could imagine a focus on re-envisioning the relationships between people living in food desserts and their local economy. How might we foster social change and power dynamics between those individuals and local politicians, local organizations, or greater communities? I do not have answers, but these are questions worth asking and exploring in the design process.

Envisioning how intervention sites become possible avenues for social change is a key process for design and agency work. Here, designers must uncover, deliberate, and layer multiple sites of intervention that create short-term coalitions to strengthen a potential impact's possibility, scope,

or scale. In doing so, designers make alliances, tradeoffs, and hedge bets, while working towards the possibility and promise of eventual impact.

Key Question: Who are the stakeholders within this social issue? What are the relationships between those stakeholders? What is open to change?

Many design projects focus on technical change, but not necessarily social change (*e.g.*, Herbert Simon's famous claim that design "chang[es] existing situations into preferred ones" [Simon, 1996]). In contrast to Simon, STS scholars have broadly argued that while new technologies may disrupt or change certain practices, they often serve to reinforce the status quo and the social relations within power dynamics [Suchman, 2011; Barry, 2001; Wajcman, 2014]. By social change, I refer to disruptions or reconfigurations in the social relations that produce social inequality [Hurst, 1998; Schwalbe, 2007].

If design typically brings about technical rather than social change, then perhaps another way to focus on developing and envisioning impact is to focus on the relationships between stakeholders and changing the relationships that produce inequalities. Then, despite the tendency for design to only bring about technical change, design practice equipped with the right orientations, tools, and methods, may be well suited to embolden social change. I will highlight two ways in which design as a practice is well suited to bring about social change.

First, designers focusing on complex social issues cannot only address material needs, but must intervene in the complex situations that produce those needs. Social issues, like hunger or food insecurity, often have urgent components that, if unattended to, cause harm. Designers must balance people's immediate, urgent needs with how fulfilling those needs might bring about larger social change. For example, I can envision a mobile application that helps a person find nearby

application assistance for nutrition assistance programs, but also helps them advocate for others by giving them "bonuses" for helping others with the application process. Here, social change could be possible by attempting to enact broader social support networks. Another way to focus on impacting relationships could be on the dissemination and use of knowledge. For example, an online system that helps local community gardeners with information pertinent to growing and farming could also keep users updated on information regarding local legislation and policies that could impact their practices, pertinent city council meetings, and how to help rally to have their voices heard at local council meetings. Here, the focus on social relations keeps the populous well-informed on civic matters. By keeping gardeners informed, such educational pursuits carry the potential to shift the relations between local community gardeners and local city councils.

Second, another way to bring about social change is to work towards broadening how people understand the possibility for new futures and different ways of being [Dunne & Raby, 2013]. Design can create objects that help people reconsider existing social relations and make the world more malleable. Therefore, a social change project's design goal could be to sustain the belief that change is possible, and that alternative futures may exist. In this way, design process can nourish the collective imagination with new possibilities and ways of being.

6.1.3 Assessing Possibility

In this section, I demonstrate how design is a pragmatic and situated activity [Simonsen *et al.*, 2014; Fallman, 2003], wherein workshop participants assess avenues for social change and impact. In this assessment process, participants frequently turned to their existing relationships to imagine engaging with various stakeholders to achieve their goals. I examine the assessment process that

the workshop participants engaged in, and how that assessment constrained and enabled the potential ways workshop participants envisioned developing impact to the best of their resources.

When assessing what was possible in the design process, workshop participants assess other stakeholders and relations in two ways. The first way participants assessed their social connections was by *perceiving capabilities* of other stakeholders, as well as both how the system may need to account for current stakeholder needs, and how those needs may shift. Workshop participants sought to not only attend to current needs, but also create the conditions where their services (as nonprofit organizations) were no longer necessary. Second, in some cases workshop participants assessed other stakeholders and determined they would not align with the project, usually that they would drastically change the project. This often happened in situations where workshop participants articulated a need for restitution (*i.e.*, a corrective measure for a previous injustice) and then did not seek corrective measures. Instead, they actively *deferred* potential social *obligations*, usually by reframing those obligations or changing how they understood the problem. *Deferring obligations* happened for two reasons. In some cases, workshop participants believed they had a limited capacity to ensure restitution, and therefore, elected to focus on other issues because they saw a small chance for success. Other times, they wanted something else from that stakeholder, and did not believe it would be feasible to both simultaneously demand restitution and seek partnership.

In this section, I demonstrate participants' orientation towards these social relations influences how they are able to envision impact and what is actable within a design project, which is important for envisioning different ways of working towards social change.

Assessing Possibility: Perceiving Capabilities

Workshop participants assessed connections by imagining other's capabilities, usually potential clients, community members, funders, and partnering organizations[11] (*e.g.,* other like-minded organizations or institutions)—all stakeholders that they would likely have to connect to in order for their envisioned system to succeed. In all of my workshop groups, I tried to balance various types of stakeholders, including nonprofit workers and community members, but not all workshops included multiple types of individuals. However, when key stakeholder groups were missing, such as community members, nonprofit workers had to rely on their previous experiences to come to conclusions about the needs, goals, and capabilities of those missing community members. Often, these insights and discussions of other individuals or groups of individuals was quite similar to personas. Within design practice, personas are a common method where designers craft fictional people that represent a target user group and are based in empirical research [Blythe, 2014]. While personas purportedly help designers stop designing for themselves, and instead, design for their users [Cooper, 1999], other design researchers have accused personas of perpetuating stereotypes [Nielsen, 2002].

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[11] I want to briefly note, that, for their designed system, every single workshop group envisioned working with external partners (*e.g.*, hospitals, grocery stores, restaurants, community organizations, and so on). However, these envisioned partnerships did not appear to have a strong impact and assumptions were often not vetted by workshop partnerships. This was likely due to the short time table for the design workshop sessions. Therefore, I will not discuss these in this here, because they didn't appear to impact the design process much.

In workshop group D, no community members were present, only nonprofit workers. Group D focused on how to build a location-based application that would help food insecure individuals find locally available food resources. I often saw workshop participants discuss their perceptions of community members' capacities in terms of how they envisioned a system might be used and/or how a system might build on current those skills, knowledge, and other resources "to build bridges out of poverty[12]" (Alyson, Food Bank Project Manager). These discussions on community members perceived current capacities influenced the group's design. Beyond only accessing food resources to contend with their community members' urgent needs, the workshop participants envisioned a system as a path towards no longer needing food-based assistance, whereby food insecure individuals could access other forms of educational and economic assistance (*e.g.*, methods to help them receive job training and education). This added functionality included a section on helping individuals prepare for or find jobs (*e.g.,* interview training services, listing places that would clean a work outfit, and so on), and educational opportunities so individuals could qualify for jobs (*e.g.*, job skills training, university prep classes, and so on). Such forms of assistance were perceived as the best way to boost food insecure individuals out of poverty by leading to better, higher paying jobs, and thereby eliminating the need for food-based assistance.

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[12] Bridges out of poverty is a term of art from the philanthropic service sector that refers to strategies for helping low-income communities "leave" poverty [Payne, 2001]. It is often heavily critiqued as being classist and racist by poverty scholars (*e.g.,* Gorski, 2006).

This idea of changing the existing conditions so that service agencies will no longer be necessary reveals a tension within nonprofit organizations. Nonprofit organizations must both serve their local communities and their funders; however, what funders want is not always what the community understands as useful. Funders often reward nonprofits for quantifying their impact in terms of the number of individuals served. Impact tends to be defined by the number of unique community members who were assisted (*i.e.*, meaning that in many cases if they help a person more than once, they do not receive as much "credit" from their funders, which often translates to a real economic impact for the organization). However, if nonprofits were to substantially address their local communities' needs, the number of people served should theoretically decrease, because they no longer need external support. Nonprofit workers referred to this strategy as "putting [them]selves out of business" (Sally, a food access nonprofit manager), and had concerns that this strategy would be a hard sell, and difficult to demonstrate to funders. For many nonprofit organizations, the ability to impact and help their communities directly ties to funding procurement. Group B discussed the pragmatics of adding a "holiday bonus," and the how that related to potential project funding.

"Funders and people are so programmed to think that people are only hungry at holiday time. We like to say here [at the food bank] that hunger does not take a holiday. I think they would [be interested in funding this holiday component] because this falls into another bucket: people like holiday programs. So [this] probably wouldn't fall under the same pool of money other than "oh people want to donate to our holiday time"? They'd want to sponsor a program that gives people an extra bonus during the holidays. [Multiple workshop participants agree in the background.] […] You could wrap it in a whole promotion of holidays and fresh vegetables and you could also couch it in how they do summer programs. So another big gap is when people's kids are not in school. We sell that [to funders] by telling people we are feeding people's kids when the kids aren't in school. It could be couched in that as this is a meal-gap program between here and there. So people can have healthy stuff for their kids to eat while they are on breaks. And so that would be for support and that's for a finite amount of time. You could go over for a month." – (Rebecca, Group B, food bank worker)

Nonprofit organizations have limited resources to respond to the needs of their community, which influences how they envision new forms of impact. In each of the preceding clusters of quotes, participants articulated a desire to do as much as possible for the populations they serve. Ultimately, in order to achieve this, they need to be responsive to funders and donors, not just their local community. While presumed funding and feasibility are pragmatic concerns for these organizations, such concerns may be unnecessarily constrained by "the politics of the possible" [Guthman, 2008a]. What funders want (or are willing to fund) may not always benefit the community, yet thoughts about feasibility are always present.

Assessing Possibility: Deferring Obligation

Social obligations are produced through our interactions with each other. In this context, I refer to restitution, wherein an individual or organization owes others compensation for a prior injustice. Lötter states that people deserve restitution if another's actions impact their lives [Lötter, 2011]. Defining social obligations is a key aspect of understanding and situating justice, since unjust actions occur. Recognizing these unjust actions and actors then allows individuals to see how restitution may be outlined, developed, encouraged, and ultimately fulfilled.

Within the design workshops, notions of deferring social obligations came into question when workshop participants discussed and identified unfulfilled responsibilities. In every case in which workshop participants identified an unfulfilled social obligation, they deferred fulfilling those obligations. By deferring obligation, I mean that workshop participants explicitly discussed concerns of unfulfilled social obligations, but never elected to pursue fulfilling those obligations. Instead, they always laid any discussed option aside because they were deemed unproductive, unlikely to enforce restitution, or even hindering of future interactions.

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This practice of deferring obligations was most strongly present in Group E. Group E ultimately chose a radically different project than the one this chapter discusses. I will not be discussing the project they choose, because this next section focuses on problems and projects they did *not* choose, and why.

In workshop group E, participants discussed challenges of the current, local food system. They then identified key players they felt had the most influence and responsibility to impact the food system, in this case politicians who had the capacity to positively impact food access for the food insecure, but did not. For Group E, participants felt that local and state government officials had a lot of influence over their local food systems and governmental nutrition programs (*e.g.*, WIC, SNAP, and so on) that supported food access. We then discussed how workshop participants could encourage those politicians to use their influence and political power to act for local communities' enrichment. This included discussions on how to hold officials accountable for negligent or harmful voting and other political practices that adversely affect food access outcomes for local community members. For example, they discussed methods of gathering nonprofit workers and community members through coalition building to create "calls for action" for hunger issues. We then discussed how information portals and community meetings could inform voters of politicians voting outcomes and how to contact those representatives. Ultimately, every option for pursuing accountability for politician's voting practices was laid aside. Participants outlined several reasons why they were not going to pursue accountability. First, they articulated that they believed it was not a productive option, since that method of advocacy (*e.g.*, consciousness-raising, spreading awareness, and so on) would ultimately fail to change food access outcomes. Nonprofit organizations have limited resources and must conserve those resources for plans they believe to be the most effective. Secondly, participants are institutionally dissuaded from "advocacy" work (*e.g.*, calling politicians,

going to community meetings, and so on), because funders and donors tend to explicitly avoid funding political advocacy projects or work. Rather than pursue restitution for social obligations, these workshops participants elected to defer those projects, and instead chose a different project that would directly work with local communities.

There are two points I would like to make about deferring obligations. First, deferring obligations is a tactical strategy, where workshop participants assess their current resources and relationships en route to a decision that they should not pursue restitution (*i.e.*, it "costs" too much, and they get too little in return). Given their limited financial, physical, and social resources, deferring obligations is a reasonable method for trying to contend with social issues when the concrete payoff to the local community seems unlikely. Second, if groups always defer these obligations requiring restitution, rather than pursue radical change, there are implications for social justice design projects. Namely, such practices ignore corrective justice, or "rectify[ing] the injustice inflicted" [Weinrib, 2002] on others in the past, as a possible avenue for social change. This can be detrimental because it diminishes the ways in which designers can address existing concerns.

Questions about Assessing Possibility

Key Questions: What are the contributing factors that create the conditions for the need to exist? What relationships do we currently have to help us contend with the current needs and social inequality? How might we recognize different types of value and build on those relationships?

Design happens in relation to other practices, relationships, and settings, but rarely in perfect or ideal circumstances. This is especially true for designing information systems for nonprofit organizations, which tend to lack abundant resources or capital, and must often "make do" with

that which is easily rendered available. The design practice of making do can be understood as a method for producing a type of patchwork assemblage, whereby designers work to address local needs with the given resources, both real and imagined. Human social relations play a significant role in those assemblages, helping designers envision new potential outcomes and shape understandings of latent capacities. Given this, we should examine how we, as designers, should seek to build new capacities that build on existing skills, knowledge, and resources to contend with local needs.

Key Question: What is the potential for external stakeholders to become your ally? What benefits do you get from this connection? Given these new connections, has the framing of the problem changed? How might your allies impact your project or design practices?

Design is a socially situated activity [Simonsen *et al.*, 2014; Light & Luckin, 2008; Suchman, 2011]. Designers defer, reify, and build social relations through their practice, which are then imbued into designed objects. While these partnerships can help produce the groundwork necessary for collective action, they come with obligations and associated costs that can shape how the designer imagines what is possible and acceptable for social change. Allies, such as funders, make particular kinds of practices and work possible through their support, but also may participate in perpetuating particular kinds of social conditions that unduly constrain designer's ability to work. For example, Guthman argues that norms of nonprofit organizations, including philanthropic funding practices, "shape what is thinkable and hence actable" [Guthman, 2008]. Therefore, designers and community organizers should wisely choose allies, given that they will likely impact what projects can be envisioned and how people work towards the greatest capacity for change.

6.2 Conclusion

In summary, in this chapter I have shown that designers can reflect on their own design practice by attending to three key questions. These questions help designers understand the obligations created through the design processes and disentangle how they conceive of justice in their projects. Furthermore, I have shown how these questions make visible the tradeoffs in the design process, which helps designers to better balance the ideals of justice with design's grounded pragmatism. These three key questions are:

1. How is the problem understood?
2. How and what impact is possible?
3. What resources are available to develop impact?

These questions illuminate how design choices are consequential during a design process that orients and aligns with social justice goals. Given that there are many complicated, non-agreed upon definitions for social justice, and that social justice's concepts are multi-layered and intertwined, it can be difficult to analytically understand what is at stake without formal training and forethought. Hence, the key questions derived from this work will help designers in their design examinations and planning. Many design processes may have restrictions (*e.g.*, time, resources, and so on) that cause them to leave these concepts and core questions hidden, or under-interrogated/examined. By rendering these concepts and key decisions visible, designers will be better positioned to disentangle those key concerns, while trying to understand the "right" way (for themselves and their project) to approach a particular problem. By examining how we, as designers and HCI scholars, understand and orient towards justice, we can produce more robust theoretical contributions that focus on the capacity and constraints of various sociotechnical interventions addressing social inequality.

Chapter 7: Conclusion

In this dissertation, I addressed the following three questions related to sociotechnical public interventions and justice:

1) How can the mismatch between the design and actual use of e-government systems inform our understandings about the limitations and capacities of public sociotechnical interventions?

2) Given the information goals of hunger-focused nonprofits, how might we design an inter-organizational location-based information system to promote collective action amongst these organizations?

3) What are the key design decisions that impact how participants situated concepts of justice in their own experience in a project, and what are the implications for design practice?

In this dissertation, I present justice as an alternative way for design to contend with, take up, and understand these systemic social issues and plausible, reasonable interventions. I examined and designed three public[13][12] sociotechnical interventions for hunger and food insecurity. These examinations take three distinct forms, enabling me to investigate the concept of justice as it is implicitly and explicitly involved in multiple stages of the design and development process: a qualitative study of an existing e-government system, the design and prototyping of a potential new system, and the conduct of participatory design workshops. I have shown that HCI already

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[13] By public, I refer to these technological systems that are situated in communities, local governments, and community-focused philanthropic organizations.

implicitly engages with concepts of justice, but that an *explicit* engagement can help us better understand the strengths and limitations of the design interventions we examine and produce.

In each chapter, I have shown the following:

Chapter 1: Introduction

In Chapter 1, I outlined an emerging question in HCI and how the design of sociotechnical systems might intervene in large, systemic social issues. I also presented a case for justice as an alternative way for design to contend with, take up, and understand systemic social issues.

Chapter 2: Literature Review

In Chapter 2, I examined related works in social computing, critical reflective interaction design, and social justice studies. I considered how concepts of justice are defined and employed. This literature review highlighted salient literature regarding social and food justice about sociotechnical public intervention, and the ways in which justice provides an alternative frame for design practice.

Chapter 3: Methods

In Chapter 3, I articulated my methods. Each method helped me understand different facets of sociotechnical interventions and their relationships to concepts of justice. I reviewed each project and their associated methods. These methods included qualitative empirical methods to examine current practices and build relationships, and critical reflective design methods to explore possibilities for action and change.

Chapter 4: Sociotechnical Practices of Public Interventions for Hunger

In Chapter 4, I examined how hunger-focused nonprofit organizations helped their local community

members access and use online government applications. I demonstrated that although state-led technology initiatives hold the promise to create additional access to government programs, access to and use of online application services does not happen without local nonprofits' considerable direct interpersonal and technical support. Given the vital role these nonprofit organizations play for their local communities, this chapter emphasized the importance for design to take into account these broader supporting social relations, and move beyond just individual community members.

Chapter 5: Designing for Collective Action Amongst Hunger-focused Nonprofits

I Chapter 5, I shared findings from a research-through-design project, in which I co-designed an inter-organizational location-based information system to help local nonprofits address shared information goals. Based on this study, my work demonstrated that the inter-organizational politics of funding, visibility, and control must be taken into account when designing for collective action among hunger-focused non-profit organizations.

Chapter 6: Food Justice & Participatory Interaction Design

I held participatory design workshops with urban farmers, hunger-focused nonprofit organizations, and community members to deal with local food insecurity issues. This enabled me to examine how participants situated concepts of justice in their own experiences and practice through an analysis of those workshops' outcomes and processes. I presented three categories of key design decisions that impact how participants situated concepts of justice in their own experience. My work demonstrated how design practice can be tailored to support and explicitly consider concepts of justice within a participatory process. By drawing attention to these key design decisions, designers can better engage with social justice projects at the level of sociotechnical systems and large-scale social problems, and their implicit assumptions about justice.

As an amalgamation, this work has several broader contributions beyond each study's context-specific findings I reported on in the previous chapters. First, I will articulate why justice matters for design practice. Second, there are implications for a just design practice for addressing social issues, and I will outline several considerations for such a just design practice. Third, I will reflect on the relationship between design and justice, as informed by my research.

7.1 Why focus on justice in the design process?

In this section, I articulate why justice matters as a focus for design theory and practice within HCI. I argue that a focus on justice expands upon existing concepts, such as value or social good, by drawing attention to key concerns about attending to multiple (sometimes conflicting) perspectives within stakeholder groups, providing tools for designers to reflexively encounter their own subjectivity as part of their design process, and distinguish charity from justice. Therefore, a more explicit scholastic engagement with the concepts of justice will benefit our scholarship by bringing additional rigor and reflection to examining the strengths and limitations for design (as a method and outcome) to intervene in complicated social issues.

First, justice as a concept moves beyond pre-established "good" values within HCI to encourage "polyvocality, diversity, and multiple perspectives" [Dourish & Mainwaring, 2012] in the design process. As a design focus, justice aligns with prior work within Values in Design, Participatory Design, and HCI communities, which acknowledges that "decision-making [in the design process] involves more than having a voice; it means having a say" [Bratteteig *et al.*, 2013]. Prior work in these domains highlights the importance of attending to who is allowed to speak and who controls agenda and scope in the design process as a way to ensure partners have a say [Bratteteig *et al.*, 2013]. Within the design process, partnering with those who have experienced

and worked to end oppression (*e.g.,* based on class, race, gender, ability, sexual or gender orientation, and so on) is a good starting point for understanding their particular experiences. There are several ways in which this dissertation addressed a multiplicity of perspectives. For example, in Chapter 5, I discussed the design of a location-based information system that worked across the ecology of hunger-focused nonprofit organizations. By working with multiple individuals from different stakeholder groups, I was able to learn about key facets of how those organizations work in ways that help design as to not preference one organization type over another. In particular, my work demonstrates the importance of attending to inter-organizational politics of funding, visibility, and control when designing for inter-organizational collective action.

Attending to polyvocality in the design process includes acknowledging the designer's positionality, values, and politics. A long-standing debate amongst the HCI Values in Design community has focused on examining whose values should drive the design process and how those multiple, and sometimes contradicting and competing, opinions should influence the design process and how we understand technology (*e.g.*, Alsheika *et al.*, 2011; Le Dantec *et al.*, 2009; Ames *et al.*, 2011). While it would be problematic not to focus on users and acknowledge their values, experiences, and practices in the design process (which is the very definition of user-centered design), it is equally problematic to presume that designers' merely serve as amplifiers of their users' values. The relationship between the design process and different stakeholders' (*e.g.,* designers, researchers, community partners) positionality, values, and politics is far more complicated. Much of the existing work within Values in Design and HCI tends to downplay the role of the designer's values and their own subjective experience, which likely stems from designer's desires to be seen as more objective and neutral, and therefore more scientific [Suchman, 2011]. Alternatively, it may stem from wanting to "give voice" to the marginalized, which is a laudable goal. However, taking up social

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justice requires active reflection on how designers' own beliefs and values influence design's processes and outcomes, and how their "vision of the world is a vision from somewhere" [Suchman, 2002].

Second, a just design process provides tools for designer reflexivity. Other work within HCI raises concerns around issues of subjectivity and reflexivity (*e.g.,* Light, 2011; Harrison, Sengers, and Tatar, 2011; Agre, 1997) and has identified similar issues. In this work, justice is a complementary approach to queer and feminist theory within HCI. To engage issues of researcher/designer politics and their visions 'from somewhere,' Light calls for designers to "engage in researcher reflexivity; challenge the hegemonic dominance, legitimacy and appropriateness of positivist epistemologies; theorize from the margins; and problematize gender" (Light, 2011). Harrison *et al.*, suggest that the "phenomenological situatedness of users, designers, and researchers" is central to design research, and argue that researchers, "should articulate to the extent possible the intellectual and political commitments that the authors bring to a particular project" [Harrison, Sengers, and Tatar, 2011]. A justice-based approach is rooted in similar concerns, and provides one set of strategies for researchers to bring political issues of class, race, gender, status, and sexual orientation to their projects' fore. A just design practice does not just acknowledge the politics inherent in the design process and academic endeavors, but provides a concrete way to integrate these concerns. By providing a set of key questions, the justice-based design processes that I have described in this dissertation provokes designers and researchers to explicitly and directly attend to their own politics. This attention to politics requires asking tough moral questions about their own involvement in their designs and work, encouraging designers to develop awareness of their own situated politics.

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In Chapter 6, I highlighted some questions that could help a designer reflect on their own thinking. This included questions about how a designer was situating and framing a problem (*e.g.,* What is the scale of your problem frame?). Other questions were posed to help designers reflect on how change was envisioned or deemed possible (*e.g.*, How is social change possible? Where are the speculated sites of intervention? How are designers creating capacity for the oppressed to impact their own lives and the larger social food system?). Lastly, I posed questions that take future-thinking orientations, helping to build on existing social platforms to generate new resources for addressing social needs (*e.g.,* What are the contributing factors that create the conditions for the need to exist? What relationships do we currently have to help us contend with current needs and social inequality? How might we recognize different types of value and build on those relationships?). In addition to the questions Chapter 6 posed, these questions also include asking if designers are actually doing the work of fostering the potential for equality. If they are not, this then draws attention to the possibility that designers and researchers may not actually foster equality, which raises the question of what in fact they achieve (*e.g.*, are they merely making a name for themselves using other's people's oppression to move their careers forward)? Another key question worth exploring focuses on the politics of being an ally for an issue you do not necessarily directly experience. If a community, partner, or cause becomes too difficult to deal with, researchers and designers not directly affected can "walk away" from their involvement, or move on to their next research idea. In my own work, this issue arises. For example, in Chapter 6 I described my work with Atlanta area nonprofits. I knew, setting out, that I would only be there temporarily, and would likely "walk away" from the project at the end of the summer. By contrast, the people who participated in my focus groups would continue to be involved in the Atlanta food insecurity situation, either as people experiencing it, or as service providers, or both. I knew these people

were giving me their valuable time, and I wanted to give something back. Although the specific

projects we discussed were not fully brought into being, I structured the research project so that

they would still gain some benefit through networking, learning a design language, and connecting

to additional potentially helpful resources. Thus, even though I was "walking away" from a

particular situation, I tried to structure the research encounter so that participants derived benefit

from our time together.

Further explorations on the ethics and participation of being a "good" ally for social justice causes

within HCI are needed. By examining how we, as designers, examine how justice implicitly and

explicitly informs our projects, we can produce more robust theoretical contributions focused on

the capacity and constraints of social inequality interventions.

Third, a just design practice distinguishes between justice and charity. As I stated in the

literature review chapter, hunger-focused nonprofit organizations often develop programs that

orientate towards their clients with the charity model, which can be problematic as an underlying

ethic. While charity can signify "unselfishness, tolerance, altruism," it can also carry a burden as a

"gift, offered with condescension and accepted in desperation, that is necessitated by incapacity and

failure" (Poppendieck, 1998). Poppendieck, a food insecurity scholar, argues that charity is harmful

in three ways: suspicion, depersonalization, and indignity. First, organizations can become

suspicious of those they serve, often creating and enforcing eligibility requirements that require

excessive need documentation. Second, those same disproportionate eligibility requirements

contribute to the depersonalization and dehumanization of the individual seeking aid. Lastly, the

process of seeking aid from others is often infantilizing (Poppendieck, 1998). Given these negative

aspects of charity, a justice-based approach in their design process works to promote dignity, encourage choice, partner with the oppressed, and address power dynamics.

For example, in case online food market system described in Chapter 6, the design project aimed to do something different than charity. Instead, the project focused on leveling the playing field between urban farmers and high-end consumers, keeping agrarian-based money in the local economy, and rebranding local urban farmers. Such a system would work to keep food and economic choices open for the urban farmers by providing an alternative platform to interact with the high-end consumers who wish to support local efforts. Additionally, such a system can reconfigure the relationship between those two groups by shifting control of the urban farmers, enabling them to find alternative methods to articulate and represent themselves. Instead of charity, the system's design, plans, and discussions all addressed the economic disenfranchisement these urban farmers were experiencing.

Charity can reinforce a power imbalance or relationship dynamic between two individuals, whereas a justice-oriented perspective seeks to address that imbalance, starting by aligning with that person and their struggle, and attempting to work with them to understand what is possible to address their oppression. Here, the difference involves attempting to be an ally, rather than a "savior" (Daley, 2013). Previous work looking at nonprofit and non-governmental organizations within the philanthropic sector state that "new configurations of networked relationship [can] obfuscate the workings of neoliberal imperialism; thus [the] reinforcing global power hierarchies in which hegemonic powers are depicted as humanitarian 'saviours' whilst enforcing 'accumulation by dispossession' in the periphery" (Daley, 2013 citing Harvey, 2003). Thus, some efforts may appear philanthropic in nature, but upon further examination those participating may fail to realize how

their activities and practices may reinforce oppression or the status quo, as many of these activities tend to be in "opposition to [the local] agency and progressive social movements" (Daley, 2013).

Justice differs from charity because such a perspective acknowledges the oppression a marginalized person has undergone, and that that oppression likely originates from or is influenced by factors outside of the individual's control. While charity can help attend to immediate needs, justice expands on this by questioning, "Why is this person experiencing this need in the first place?" As I stated in Chapter 6, there are multiple ways to frame a situation. A justice-oriented perspective widens the arena in terms of how context and situations are understood in relation to how oppression is experienced. Therefore, calls to action include contending with the individual's immediate needs and the larger context that produces the potential for oppression.

Returning to the case on the online food market, here the identified issue was the unfavorable food market, not the urban farmers themselves. However, you could imagine designs that focus not on the food market, but rather on the individual and the immediacy of their needs.

In sum, justice is an alternative way to understand and orient towards social issues within a design process. This alternative understanding is important for several reasons. First, it moves beyond established good values to embrace polyvocality and multiple perspectives. In doing so, it encourages self-reflexivity to attend to the strength and limitations of the designer's own subjectivity, and how it impacts the design process (*e.g.,* how projects or partners are selected, and so on). Justice also distinguishes itself from similar pro-social concepts like charity. Although charity can help serve an individual's immediate needs, justice widens the purview to include investigating why that need exists in the first place. A focus on justice is a focus on the cultural and

political factors that come into play to contribute to social issues. Such an analysis moves beyond individuals to investigate how those larger factors impact experiences of inequality.

7.2 Broader Implications for a Just Design Practice for Social Issues

Building on this dissertation's results, I present five considerations for design practice focused on addressing social issues. Design is both an action-oriented activity and a planning process. These considerations directly support design and evaluation processes as they unfold. First, designers should *balance immediate needs* while working towards *radical social change*. Second, designers should *take a systems approach* to understand core social issues. Third, designers should *partner with communities*, rather than just individuals. Fourth, designers ought to *embrace conflict* in social justice design processes. Finally, designers should take time to *reflect on design's limits* within design practice. These implications for design practice reflect the concepts of justice as explored in this dissertation. In this section, I describe these implications in more detail and with an eye towards articulating how each one may unfold in a design practice and its associated social complexities.

Balance the Multiplicity of Needs, Circumstances, and Social Change

Social needs are situated in complex settings where individuals experience urgent needs and the matrix of sociotechnical public interventions intending to help people contend with those needs. Often, there is a breakdown between those needs and the interventions meant to address them. Justice, as an analytic lens and design approach, provides insight into the gap between needs and interventions.

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To contend with this gap, I argue that designers should take on a two-pronged approach for contending with systemic social issues: supporting urgent needs, and fostering conditions for social change. First, urgent needs, like hunger, must be supported and fulfilled. In other words, people have to eat before any radical social change can occur. There are a wide variety of ways in which the technology and information design can support these urgent needs. For example, from a nonprofit perspective, information systems can help hunger-focused nonprofits better distribute food to those in need, or find new food sources (*e.g.*, Dombrowski *et al.*, 2013). Additionally, from a community member perspective, support in accessing and applying for resources, like governmental nutrition programs, would be particularly useful because it would help them meet their long-term food needs. Likewise, information systems can help community members grow their own food or participate in local community gardens.

Second, after urgent needs have been addressed, information and community technologies' design can foster the conditions for social change. Social change is necessary to shift the underlying social conditions and relations that perpetuate social inequalities, otherwise those needs are likely to persist. There are many ways in which ICTs' design of can foster social change, for example: identify capacities and goals; focus on the needs of marginalized groups; build capacity for resistance; and foster community engagement and decision-making. My work suggests that it is important to take a multi-layered approach instead of trying to focus in isolation on only one of these. Instead, design for social change can be more effective by recognizing that these activities and projects must happen in a constellation, which can be fostered through long-term community-based design research processes. Such an approach can foster the conditions for social change by presenting new opportunities to shift the social relations between the oppressed and those in power.

There are multiple ways to envision social change, including direct and indirect methods to work towards it. Resistance is one way to envision the relationship between the oppressed and the oppressor. The individuals I worked with (*i.e.*, nonprofit workers, urban farmers, community members, and so on) all had comparatively low-positions of power, and may lack resources for long-term direct action (*e.g.*, active protests, refusal of certain services, and so on). These individuals may not have the capacity for, or access to, the means for long-term direct action, as it requires a stockpile of political, social, financial, and material resources. Therefore, practices like "peasant resistance" [Scott, 1985], where people do not take direct action to resist a state, but instead engage in noncompliance practices, may be reasonable avenues to engender social change. Fostering resistance is an approach to creating the possibility for reconfiguring the relationship between oppressed and oppressor in ways that may create the potential for social change. Therefore, the designer's goal should be to both examine multiple forms of social change, including resistance and direct action, as well as to understand their community partner's social change alignment, desire, and capacity.

Designers may experience difficulty when simultaneously fostering projects that both address immediate needs and work towards systemic social change. Different projects and goals align with different types of end goals for justice. Therefore, there are complications, and sometimes incompatibilities, when navigating different paths towards justice. For example, attending to food insecurity and helping people get enough food resources aligns quite well with the ethos of equitable physical resource distributions, whereas working towards social change better aligns with power distribution and decision-making. While neither of these projects would be incompatible with their larger values and longer-term goals (*i.e.*, having a more equitable experience of the food system), in the immediate term, those ethos would likely take on very

different kinds projects. Despite these complications, designers ought to take on multiple types of projects, with both shorter and longer-term goals, because a diversity of approaches is necessary for contending with thorny social issues like hunger.

In sum, designers should find ways to develop projects that support urgent needs, in concert with projects that find ways to promote social change within marginalized communities. Designers should seek to balance both types of projects, given that the imperatives for each may seem to compete. Such an approach will help make sure that urgent needs are being fulfilled, while also producing the groundwork for larger social change. If we only focus on current, urgent needs, we will never foster equitable social change.

Take a Systems Approach

In the context of this dissertation, a systems approach necessitates examining issues at a broader connected system level, in this case the food system, in addition to understanding individual-centric positions. Much of the food-related interaction design projects focus on individual consumption or usage (*e.g.*, Kerr *et al.*, 2014), but there are other food-related subjectivities beyond that of "consumers." A principle of a just interaction design practice must account for multiple subjectivities and stakeholders that can be traced through broader legal, political, and social systems. In this work, a systems approach broadens the design focus from how people consume food, to how technology and design play a role in fostering equitable processes of food distributing, growing, producing, cleaning, preparing, and so on.

Examining the practices and stakeholders of a food system presents new understandings of challenges, and therefore generates new possible sites of intervention. Some concerns are best understood at the level of a state's or country's broader food system, rather than an individual or

even local community level. For example, concerns around inter-organizational politics are important for understanding the working relations of broader food support systems, like hunger-focused nonprofits and their donors. Additionally, a food systems approach would take into account systemic equity, meaning that the benefits and burdens of a food system are equally shared. For example, farm workers are a core component of the American industrial food system. A just interaction design practice should take into account their experiences of the food system to ensure that those workers are not unfairly burdened (*e.g.*, pesticides exposure, and so on). This raises questions for design and how to take into account such multi-interested stakeholders at the level of an interconnected system.

A systemic approach expands beyond an individual to encompass a multi-level perspective, allowing for the contemplation of an aggregate of concerns and issues that smaller scales obscure (*e.g.*, the power dynamics within low-income communities and food providers [Glanz & Yaroch, 2004]). Contemplating the food system extends the scope of the design process away from a site of one small process or local community organization, and out towards the bigger systems of social and institutional structures and life cycles. For example, to work towards a just food system, interaction design needs to consider the lifecycle of food and the diversity of stakeholder experiences—of farmers, grocery store operators, food banks, land owners, agricultural policy makers as well as social service policy makers, school lunch programs, food marketers, etc.—within food systems, as well as how larger institutional structures and life cycles impact how food is experienced.

Partner with Communities

Creating productive partnerships can be complicated and time consuming, but partnering with organizations vested in a social issue is a key component of success. People who experience marginalization have unique perspectives that can inform the design process. By partnering with them, designers can learn a lot from those individuals and benefit from shared social and tacit knowledge. By social knowledge, I refer to the different individuals, organizations, and communities that a community member and partner is aware of and to which they are connected. Knowing who to talk to gain access to certain kinds of information or social and physical spaces is useful in the design process, because it helps get work done and open up partnerships. Similarly, partners will have social resources that a designer might be able to tap into, which could help inform design in key ways by opening up new sites and possibilities for intervention. For example, by partnering with communities, designers could gain access to valuable datasets that would otherwise be unknown or unavailable (*e.g.*, someone knows another person in local government, which opens up a new data source).

Additionally, partners often come with historical, real-world experiences and tacit knowledge. Given that partners have a unique understanding of their life experiences and how well certain strategies have worked in the past for contending with issues, partnering improves the design process' quality and outcome since the process will be better tailored to the context.

Also, it is ideal to seek multiple perspectives from within these communities (*i.e.,* multiple members from a community, or those who form a public). Partners will be very vocal if they believe you are not making appropriate choices. When considering who has a voice versus who has a say in the design process, partners should have a say because it means they will actually impact the design

process. While this will require dealing with conflicting ideas, opinions, and experiences, incorporating multiple perspectives will also establish a shared responsibility in the decision-making process and foster legitimacy around the final design.

Contending with multiple perspectives in the design process encourages a more robust and through design process that will likely improve the design's quality and effectiveness.

Embrace Conflict

Community-based work involves different types of stakeholders with different values, agendas, politics, ideals, and experiences that are productive in identifying "important information for analyzing our shared world" (Eubanks, 2011). However, this means that decisions do not have clear answers, because understanding a topic and decision-making become quite complicated given all of the experiences and external factors that influence a person's subjectivity during decision-making processes, including which problems are even worth addressing.

To further complicate matters, power (*e.g.*, social standing, influence, etc.) also impacts how articulations of problems are received. Harding, a feminist STS scholar who studies knowledge production, states, "Marginalized groups have interests in asking questions [about power], and dominate groups have interests in not hearing them" (Harding 1998, 151 via Eubanks, 2011). Marginalized voices are often silenced either through deliberate coercive actions or by a distinct lack of opportunity to speak or to be heard. Therefore, conflict in discussions, either anticipated or actively present, is a healthy sign that the project is tackling questions worth discussing. By anticipated conflict, I refer to the ways in which others may anticipate or imagine other's reactions to discussions and decisions. By direct conflict, I refer to the open contestation that can occur during discussions of problems, or how to address those issues. Aligning with the oppressed and

marginalized is one way to work against repeating the cycle of oppression and representational inequity. Helping shape how decision-making should be contextualized is one way to align with the oppressed.

Reflect on Design's Limits

Many UX design practices focus on producing products that center on users, representing the shift from when engineers were perceived to essentially the same as their "users." However, even though the shift to user-centered design widens the types of individuals that come to matter in the design process, it still places single individuals at the center of a design practice. Therefore, it inherently limits the problems technology can address to problems that are conceptualized and experienced by individuals. When designing systems for large-scale social change, UX methods can inherently bias designers towards focusing on the symptoms of the problems that the end user would encounter, rather than on the structural complexity that produces the problem in the first place. Designers may be unable to see that when action is taken on behalf of one group of people, it may detriment or overlook another group. Lastly, this one group versus another group perspective ignores the social context in which both groups operate, and the ways in which we might address issues at broader and deeper societal levels.

Design is commonly understood to be an action-oriented practice, and novice designers are frequently taught to avoid getting caught up in "analysis paralysis" (*e.g.*, Nelson & Stolterman, 2003). Rather, they are actively encouraged to do, make, build, and so on with a focus on concrete, actionable items and activities. While this mentality is productive for certain types of design activities (*e.g.*, brainstorming new ways to address an already outlined problem, typically thought of as "problem solving" and so on), it may hinder, or downplay, the importance of the analysis that

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produces new ways of understanding a situation or set of concerns, which is generally referred to as "problem framing" (Cross, 2006). Given social issues' sensitivity, the limited amount of resources to help the oppressed, and the degrees to which bad decisions could negatively impact them, we ought to take care when attempting to understand and address those issues.

There are several ways in which additional reflection can benefit a design process. First, designers should take time in their analysis to ensure they use a problem frame that takes structural issues into account during their design process. This will enable them to avoid individual-centric design, and instead will likely result in systemic-oriented design outcomes, which may be more effective in addressing large, systemic social issues. This is not to say that action-oriented approaches are not useful; in fact, once the right problem has been identified, brainstorming is quite useful, but rather that designers should take time to explore systemic-options. Second, when attempting to address social issues or inequities, in addition to technological interventions, we should also explore non-technological interventions. Design cause harm by perpetuating myths that technology or design can address all issues, rather than seeking out alternative methods such as policy or program interventions that may be better equipped to address systemic issues.

Technology does not equally impact everyone. Individuals have differentiated access to and use of technology, which will likely hinder technological deployments. Designers should design multiple redundant systems, whereby those without access to technology can still benefit from services and information (*e.g.,* having informational brochures in addition to online alternatives). Alternatively, this suggests that adopting a healthy, skeptical attitude towards design, and understanding its limits, is useful for designers. Technology may only serve to treat the symptoms of inequality and reproduce inequalities through technology and design (Li, 2007; Ferguson, 1994; Mitchell, 2002).

Again, seeing the design space and plausible alternatives may exist outside of the realm of technology design (e.g., more inclusive governmental programs).

In summary, through this work I suggest five broader implications for a just design practice for social issues. First, designers should *balance immediate needs* while working towards *radical social change*. Second, designers should *take a systems approach* to understand core social issues. Third, designers should *partner with communities* rather than just individuals. Fourth, designers ought to *embrace conflict* in social justice design processes. Finally, designers should take time to *reflect on design's limits within design practice.* Together, this constellation of design strategies help shed light on and inform design practice.

7.3 Reflections on Justice and Design

In this dissertation, I outlined a set of tools for designers to engage in a just design process by reflecting on their own assumptions, positionality, and politics. In this final section, I reflect more broadly on the relationship between justice and design practice.

A recurring theme in this dissertation is a focus on acknowledging the multiplicity of stakeholders in any social situation and design process. Given this multiplicity, defining and operationalizing the terms of justice is always complicated, and always involves compromise and conflict. The concept of justice is not clear-cut in terms of how we conceptualize and operationalize the various composite aspects of justice. For example, food justice scholars often describe justice in terms of redistributing the benefits and burdens of a food system, or by enabling people to control their own food system by producing their own food (*e.g.,* Alkon & Agyeman, 2011; Gottlieb & Joshi, 2013). These perspectives do not explore other possible dimensions of social justice, including defining who has

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the right to identify a problem, seeking out reparations for past inequities, focusing on value

generation, and so on. Even when stakeholders agree to a particular definition of justice, they often

hold competing ideas about how to in practice operationalize those goals. For example, while an

organization and community may want to facilitate better access to food resources, it is not

immediately apparent how to best achieve that goal. Supporting the production of community

gardens, figuring out better ways to distribute excess food resources, and helping people sign up for

government nutrition programs each requires different tools, tactics, and resources. There is no

single, agreed upon definition of justice, how to work towards justice, or how to know you have

achieved it. Designers should take into account these different level of analysis, perspectives, and so

on during the design process.

While justice is complicated and abstracted as an ideal, it can become operationalized in the design

process. By operationalized, I mean that the ideals of justice become concrete, particular, and

situated to a set of individuals and circumstances which are then reified in the design process. In

practice, both design objects and justice become an "ultimate particular" [Nelson & Stolterman,

2003] that is grounded and embedded in a context, time, and set of relations during design

decisions. An ultimate particular, a term of art from design theory which refers to the unique and

particular outcomes (*e.g.*, services, applications, objects, and so on) of the design process, is "the

outcome of a specific design process" or the specific design, and requires design judgment to make

it happen [*ibid*.]. We make ultimate particulars by making judgments or decisions in the design

process. This work produces three key design decision categories that inform design judgment.

While justice can be seen as an abstracted ideal, and design the act of concretizing particulars,

within this work I sought to combine them. With this amalgamation, we get grounded accounts of

thinking through concepts of justice, in situated and particular ways that are useful for designers of social justice projects.

Just design practice often must be pragmatic, and so must justice. Design deals with existing situations to produce changes, whereas when working towards justice, the social-justice oriented change activities should take into account current resources and constraints to foster desired outcomes. This work highlights the inherent tradeoffs with designing ultimate particulars for social issues. In practice, just as there are tradeoffs in design, there are also tradeoffs in justice. The outcome of the design process is artifacts (*e.g.*, services, applications, objects, and so on) that are particular to a context and set of social relations. Designs are never perfect for all stakeholders involved, and designers must make choices that may never fully address all acknowledged concerns, which produces tensions and tradeoffs [Miller *et al.*, 2007].

The practice of working towards justice involves making and then dealing with these inherent tradeoffs. All too often we have "design champions" who purport that design can save the world [*e.g.*, Ames *et al.*, 2015]. Such a viewpoint does not acknowledge the ways in which designers are situated in social cultures that shape and constrain what is possible [Li, 2007; McSwiggen, 2012]. Instead, designers should acknowledge tradeoffs and inherent limitations, which will help them develop reasonable exceptions for the artifacts and social changes they attempt to produce. Within design projects for social justice, people, policies, and infrastructure are in constant flux, which makes it improbable to guarantee a design outcome. Designers absolutely need to "dream big," as aspirations and the belief in the possibility for change are vital for designing for social justice, yet some caution may help us produce more pragmatic expectations for our social justice design projects.

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While design is a pragmatic activity, it is also an optimistic activity. By involving community members in the design process, we can channel this optimism into a kind of tempered radicalism that meets the pragmatic realities of technology design, while retaining an optimistic and transformative trajectory. Community partners can inform design praxis by developing insights about existing situations and where interventions may be possible. Community members can help produce key insights into existing situations, local needs, and challenges, and inform how design speculates possibilities for social change. Such co-speculation may help produce key results that both attend to existing needs, while also radically changing the social relations that produce those same inequities. In this way, the work of justice, in relation to design, is to help foster and sustain the possibilities for change, and to help people (community partners and designers alike) see new equitable ways of being.

In recent years, HCI has turned its attention towards addressing larger and more systemic social issues (*e.g.*, sustainability, health and wellness, and so on.). An emerging question in this area of work concerns how to design at these bigger scales, and how to intervene at the sociotechnical system level [Baumer *et al.*, 2011]. In this dissertation, I use hunger as a case study for examining and designing for systemic social issues, and explore themes of justice and design through the case of food and hunger. HCI is increasingly interested in interventions in social problems and this work highlights the importance of expanding how we understand and frame our design processes.

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