

**COMMUNITY RESOURCE MESSENGER: A MOBILE
SYSTEM AND DESIGN EXPLORATION IN SUPPORT
OF THE URBAN HOMELESS**

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The Academic Faculty

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COMMUNITY RESOURCE MESSENGER: A MOBILE SYSTEM AND DESIGN EXPLORATION IN SUPPORT OF THE URBAN HOMELESS

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For Renata and for Oliver.

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LIST OF ABBREVIATIONS

CSCW	Computer-Supported Cooperative Work.
DCA	Department of Community Affairs.
FSS	Family Support Scale.
GED	General Educational Development, a High School equivalency exam.
GSM	Global System for Mobile Communications, a global standard for mobile telephone systems.
HCI	Human-Computer Interaction.
HIPAA	The Health Insurance Portability and Accountability Act.
HMIS	Homeless Management Information System.
HUD	U.S. Department of Housing and Urban Development.
ICT	Information and Communication Technology.
IM	Instant Messaging.
MARTA	Metropolitan Atlanta Rapid Transit Authority.
MMS	Multimedia Messaging Service, or picture messaging.
PC	Personal Computer.
PD	Participatory Design.
PEI	Photo Elicitation Interview.
SMS	Short Message Service, or text messaging.
SSI	Supplemental Security Income. A U.S. social entitlement for disabled adults.
SST	Social Shaping of Technology.
STIN	Socio-Technical Interaction Networks.
STS	Science and Technology Studies.
VSD	Value Sensitive Design.

SUMMARY

Access to computers, to mobile phones, and to data connectivity has opened new avenues of interaction and created expectations about the flattening of society brought about by these new modes of production. These technologies have enabled us to recognize many forms of community—from close knit social groups to individuals who merely co-habit public spaces—and to support interaction with each other in novel ways.

The notion that modern digital technology holds promises of democratization by expanding access to information and broadening modes of knowledge production often fails to acknowledge that these benefits rely upon devices and infrastructure whose availability reflect socioeconomic contours; that the technologies that enable information access can also reinforce rather than obviate marginality due to barriers to access and suitability. This assessment points to opportunities for better understanding and better designing technologies for the marginalized or dispossessed.

The research presented in this dissertation discusses the findings from empirical, theoretical, and design based investigations of technology use with the urban homeless. The empirical work provides a foundation for understanding current technology practices among the homeless and their care providers. The theoretical investigation develops Deweyan publics as a novel frame for participatory design. The design-based investigation presents findings from the design and deployment of the Community Resource Messenger at a shelter for homeless mothers. The results of this research shed light on impact of social computing platforms on social service provision and on the ways the staff and residents used the Community Resource Messenger as a resource for identifying common issues and taking action to contend with those issues.

CHAPTER 1

INTRODUCTION

In the U.S., as in other Western nations, new forms of Information and Communication Technologies (ICTs) are rapidly changing how we interact with each other. On one hand, ICTs have enabled us to develop and recognize new forms of community that are divorced from traditional geographic and familial constraints (Bruckman, 2006; Reingold, 1993). On the other, ICTs have helped existing communities—from close knit social groups (Grinter & Eldridge, 2001) to individuals who merely co-habit public spaces (Paulos & Goodman, 2004)—interact with each other in novel ways. The examples cited here—from Grinter and Eldridge’s study of teen texting habits (Grinter & Eldridge, 2001), to Paulos’ notion of engaging “familiar strangers” (Paulos & Goodman, 2004), to Reingold’s account of early online communities (Reingold, 1993)—all share one common feature: access to, and through, technology.

Simply put, access to mobile phones, to internet connections, and to data connectivity has opened new avenues of interaction and experience. Augé, in an account of this contemporary state of being perpetually connected, describes modern society as creating and inhabiting “non-space”—a socially connected mode of existence marked by pervasive access to information, mediated by interconnected technologies rather than physical realities (Augé, 1995). What is most germane about this concept, and the perspective it lends on western society, is that access to non-space is mediated through personal devices that have come to be defined by their intimate status. It is the laptops and the mobile phones that provide access, and they do so as personal gateways largely unshared and by no means public.

Augé's notion of non-space is predicated on the observation that its inhabitants are transient, they are moving from one place to the next such that the definition of "here" is constantly in flux. This works well when considering a reasonably affluent and mobile contemporary working class—as Augé does when he introduces a modern (presumably) professional making his way through an airport:

He parked in row J of underground level 2, slid his parking ticket into his wallet and hurried to the Air France check-in desks. With some relief he deposited his suitcase (exactly 20 kilos) and handed his flight ticket to the hostess. . . .

He was enjoying the feeling of freedom imparted by having got rid of his luggage and at the same time, more intimately by the certainty that now that he was 'sorted out', his identity registered, his boarding pass in his pocket, he had nothing to do but wait for the sequence of events. . . .

Waiting for take-off, while newspapers were being distributed, he glances through the company's in-flight magazine. . . [where] he came across an advertisement for a car with the same name as his seat, the Renault Espace: 'One day, the need for space makes itself felt. . . . It comes to us without warning. And never goes away. The irresistible wish for a space of our own. A mobile space which can take us anywhere. A space where everything is to hand and nothing is lacking. . . .' (Augé, 1995, pp. 2–4)

In this apocryphal anecdote, Augé introduces technology's role in creating personal space that "can take us anywhere. . . where everything is to hand." But it is clear that this space is born of wealth, accessible to those who can afford airline travel and new cars.

Augé's notion of non-space suggests the creation of an intimate personal space in public and transient locations; however, there are individuals for whom such locations are not transient and whose residence in them is more permanent and routine. The employees of Augé's airport are not in transition: the airport is a destination and a stable and fixed location of work. Likewise, the urban homeless can be said to inhabit the public and liminal locations of the city—its streets, its public squares, its transportation hubs. For individuals who inhabit these non-places, the interactions

and the mode of life is unlikely constructed around personal spaces mediated by digital interactions, by data, and by constant connection to some other “here,” yet the presence and imposition of technologies that enable those kinds of connections certainly influence the experience of public interactions for everyone. The result is that the technologies that afford connection and communication within non-places disproportionately benefit the affluent and connected segments of society while helping to render invisible those, like the urban homeless, for whom the street is “place,” not (non-) space (Harrison & Dourish, 1996). This in turn reinforces established social strata and further marginalizes groups who have not been able to marshall and co-opt technology for their own purposes due to economic or social barriers.

A larger mythology connected to the notion of non-space is the utopian and deterministic idea that modern digital technology will introduce a new era of openness and transparency through the democratization of information, the enabling of new and meaningful social interactions, and through digitally enabled modes of participation (Turner, 2006). While it is true that ICTs have been beneficial for modern society, the rose-colored view of digital utopianism fails to acknowledge that the realization of these benefits relies upon devices and infrastructures whose availability reflect socio-economic contours; that marginality is often reinforced rather than obviated due to enabling technologies having been designed for the preferences of the well educated and relatively affluent. Mobile phones and laptops arise, at least in part, out of a culture and economic environment built around consumption (and the social significance of devices as accoutrements of class membership), yet the impact and reach of these technologies extends beyond the social boundaries of those who can afford to consume them and presents an opportunity for Human-Computer Interaction (HCI) researchers to consider different modes of conceptualizing technology use and influence (Cohen, 2005). It is from this assessment that I have chosen to explore the design of technologies for the urban homeless. I am specifically engaging questions of

co-option and use not simply as matters of access to and consumption of technology, but as a means of engaging the homeless in the conception and production of systems meant to support the goals and needs they express.

1.1 Motivation: A Domestic Divide

As the field of computing has begun to take on issues of diversity and universal access, it has become apparent that there are deep challenges in reaching certain user communities (Chakraborty & Bosman, 2005; Jackson et al., 2004; Kvasny & Keil, 2006; Selwyn, 2003). This digital divide, describing the gap between individuals with access to technology and those without, has largely been defined by geopolitical boundaries: the so-called “Global South,” for instance, has been a focal point for research into bridging the digital divide. However, the digital divide is not only a symptom of developing nations and there remains a much less studied digital divide within the U.S. (Chakraborty & Bosman, 2005).

These digital divides are interesting from a research perspective because they highlight breakdowns in our understandings of the needs of these specific communities, as well as in how we approach the design and evaluation of technology and contexts not adequately addressed under the historical HCI rubrics of efficiency and productivity. Perhaps more importantly, recent work has highlighted the degree to which addressing the technology needs of users marginalized by the digital divide is not merely a matter of making *cheaper* technology, but of making *different* technology (Brewer et al., 2006; Cogburn, 2003; Dray & Siegel, 2003; Ramachandran et al., 2007). This work—which to date has been situated mainly in the international context—has spurred both technological and methodological innovation, and an understanding that the unique constraints posed by these contexts can lead to entirely new forms of technology.

Within the purview of the domestic digital divide, much of the work has focused on establishing public access to ICTs. These efforts view public access as a way to

mitigate the economic barriers often perceived as being the most critical component to engendering ICT adoption (Jackson et al., 2004; Kvasny & Keil, 2006; Van Tassel, 1991). While this is no doubt an important factor, simply displacing the cost of access fails to recognize that for communities outside the mainstream, access to ICTs is only part of the equation. The form the technology takes (*e.g.*, mobile phone, desktop computer, laptop computer, or video game system) plays an equally important role in whether and to what degree users will engage with the technology. There are specific sub-cultural and context-specific traits that need to be considered when designing technologies that address the digital divide—whether that divide is domestic or international. Much in the way that researchers have focused on the cultural practices around food as a way to shape technologies to support healthful eating practices in low-income communities (Grimes & Grinter, 2007; Grimes & Harper, 2008), I argue that technologies that broach the digital divide necessarily need to be designed to reflect the context and cultural preferences of their would-be users.

By working with the urban homeless, I am seeking out a local yet nationally ubiquitous community of individuals affected by the fast paced adoption of new technologies in both the institutions that serve them and in the societies of which they are a part. What is striking about the U.S. homeless population is that its true diversity and invisibility stand in contrast to the often very visible and caricatured notion of the homeless male tramp (see Figure 1 in Chapter 2). This diversity provides an opportunity to engage with an assortment of users who possess a range of abilities and experiences that can inform technological innovations, practical guidelines, and methodological advances for working with populations who are not normally included in the discourse and design of new technologies.

There are limits to the kinds of problems directly addressable by ICTs, and by developing technology with the homeless community I am not asserting that I will “solve” homelessness: I acknowledge that social and policy interventions have the most

impact for the homeless community. More abundant low-income housing, long-term programs to address education and job training, help in addiction management, and appropriate treatment for mental illness are all first-order problems that continue to demand creativity and leadership. Furthermore, access to technology is not a panacea for social membership (Bure, 2005). I do, however, argue that thoughtful technological interventions can be deployed as part of the larger effort to redress the inequities of the digital divide that contribute to the marginalization of the urban homeless. There are opportunities to provide practical technologies to support the homeless and the case workers who are involved in providing aid, as well as opportunities to use participatory design to develop a discussion about technology with individuals who are not normally part of the design discourse and by doing so, extend how HCI conceptualizes and responds to users of all stripes.

1.2 Research Framing

The central question driving my research is: *To what degree do mobile technologies impact the urban homeless, affecting their ability to utilize social services and to interact as socially legitimate individuals within their immediate community?* To address this question, I have conducted a three-pronged research program. First I sought to understand the how the homeless view and use existing technologies and how social service providers incorporate ICTs into their work, this work was conceived to provide an empirical basis from which to further study and develop a technology intervention at my primary research site, a shelter for homeless mothers. Second, I set out to co-design a system—the Community Resource Messenger—with the staff and residents at my primary research site. The design work was structured around participatory design activities that started with representatives from multiple research sites and which led to longer, focused participatory work with the staff and residents at my primary site. Third and finally, I deployed the Community Resource Messenger for a

Table 1: Overview of work completed toward the dissertation

DATE	RESEARCH PHASE	DETAILS	PUBLICATIONS
Phase 1: Initial Empirical Work			
2007	Homeless & Technology	A PEI study to understand how the homeless use and perceive many different forms of technology.	Le Dantec & Edwards (2008a); Le Dantec et al. (2009)
2007– 2008	Provider Work Practices	Fieldwork to understand the work practices at two service providers, the way they organized and how they employed ICTs to provide service.	Le Dantec & Edwards (2008b)
2007– 2009	Provider Network	Fieldwork and interviews at 12 different organizations to gain insight into how they used a shared HMIS and worked together as part of an ecosystem of service providers.	Le Dantec & Edwards (2010)
Phase 2: System Design			
2009	Design Workshop	A 1-day workshop with eight providers that used an series of activities derived from Asset Mapping to develop an understanding of the resources, goals, and flows of information across the different providers.	
2009– 2010	Participatory Design	Focused participatory design activities with the staff and residents of the primary research site. Activities were structured to scaffold staff and residents in the design of the Community Resource Messenger.	Le Dantec et al. (2010); Le Dantec & DiSalvo (Under Review)
Phase 3: System Deployment			
2010	System Deployment I	The first phase of the deployment lasted 30 weeks and was accompanied by extensive ethnographic fieldwork, interviews, and survey to track system use and correlate connection to sources of help with engagement in using the technology.	Le Dantec et al. (2011)
2010– 2011	System Deployment II	The second phase of the deployment lasted 15 weeks and was focused on developing deeper insight into information consumption and production practices around the Shared Message Board.	

year at my primary research site. The deployment was divided into two phases, the first phase lasted 30 weeks, after which I iterated on the system design and collected data for another 15 weeks. Table 1 gives an overview of the research activities I carried out in each phase.

In developing my research plan and setting the direction for working with the homeless and their social service providers, three main areas of interest shaped my investigation of technologies currently in use, and of how co-designed technologies might impact the staff and residents at my primary research site. These three areas cleave along axes initially described by Brewer & Dourish (2008) as legibility, literacy,

and legitimacy. While these three areas of investigation framed my early work, it became clear as I developed my participatory design engagement that legibility (of technology), literacy (with respect to information and resources), and legitimacy (of modes of use and adoption) were in fact playing out within the context of creating and sustaining “publics” (DiSalvo et al., 2007; DiSalvo, 2009). Publics, as used throughout this document, refers to ideas about how civic participation is formed around shared issues and collective action as presented by Dewey (1954 [1927]).

In the following sections I will address each of these areas of inquiry: the questions that I initially set out to answer with respect to legibility, literacy, and legitimacy, and the overarching notion of publics as a the frame that scoped the the design and deployment of the Community Resource Messenger and in which legibility, literacy, and legitimacy were operationalized at my primary research site.

1.2.1 Legibility

Legibility, as I am co-opting it here, involves the ways in which technology and the world mediated by technology can be “read.” This reading follows from work in design research and can be understood as the affordances available that enable one to identify opportunity for action, institutional intent, and social context from the environment (Gaver, 1991; Gibson, 1979; Norman, 1988). As an example, the mobile phone is *legible* to the homeless as a technology they would use to stay in contact with their friends and family (*i.e.* as a phone), help them organize their lives (through calendars and reminders), share with their social circle (through text messaging (SMS) and picture messaging (MMS)), and provide entertainment (through games or on-phone cameras). The PC, on the other hand, was not legible in this manner despite the often richer and more sophisticated way it provides similar functionality (Le Dantec & Edwards, 2008a). Instead, the personal computer (PC) remains an abstract and distant form of modernity, perceived as beyond the intellectual ability, or the economic means of the

homeless. As a result, innovations that are closely tied to the PC retain less relevance for the homeless, while innovations that are delivered through the mobile phone may have a better chance of gaining traction due to the relevance the mobile phone already has in their lives.

For the homeless, the legibility of technology plays into how they relate to different forms and features available. The important point to note here is that the legibility of different forms of technology is *culturally* informed, it is based on experience and exposure to different forms of technology and to the ways identity is created and supported by technology artifacts (Cohen, 2005).

The specific research question I am asking with respect to legibility is: *How does the legibility of technology impact how homeless individuals co-opt that technology and use it to identify and act on the issues facing them?* The answer to this question comes from understanding the role of the Community Resource Messenger for the residents of my primary research site—how did they use it to inform themselves about access to different resources? In what ways was it used to share information and provide contextualized or situated information about services or the activities they were engaged in as they worked to move out of the shelter and into a long-term or permanent housing situation?

1.2.2 Literacy

For the purpose of my research, I am using *literacy* to frame my investigation of which forms of technological representation are the most productive and socially appropriate for the homeless. It is more than being conversant with use (*e.g.*, computer literacy) and instead places the focus on whether the representation of technology and the representation of information through technology are relevant to the user. As legibility describes the kinds of social and technical affordances of a technology, literacy describes the social and functional modes of use engaged in with the a technology.

Returning to the mobile phone—a technology whose legibility to the homeless was established by my early fieldwork—the aspect of literacy develops out of how the homeless use the phone to stay connected to their social network (through phone calls and text messaging), how they use it to secure resources they might need (by contacting service providers or using mobile internet connections to find sources of aid), and how they integrate the mobile phone into their lives not just as a functional piece of technology, but as an artifact to managing social relationships and obligations. Ultimately, literacy is about *how* a (legible) technology is used and includes both the consumption of information and experience (reading) and the production of information and experience (writing).

Under the rubric of literacy, the specific research question I am asking is: *What uses of technology emerge through use and how do those uses inform how the homeless produce and consume different forms and sources of information?* This question is a response to the desire to understand how to design technologies that scaffold new levels of technology adoption and integration—in this case technology that supports self-sufficiency and provides information seeking capabilities—by leveraging a known and relevant platform, the mobile phone. Working from existing literature on literacy, and based on the the specific needs and preferences of the homeless and extremely poor, I explore alternative representations of information made visible through the Community Resource Messenger to understand the how to use technology to organize and present information to the residents at my primary research site.

One of the challenges the homeless face is an overabundance of information about available social services.¹ In working with the staff and residents to design the Community Resource Messenger, I strove to address the information overload faced by the mothers at the shelter by providing more personalized delivery of information and by

¹See Chapter 2 § 2.3 for a more detailed discussion on the information needs of the homeless and the importance not just of providing information, but of providing appropriately contextualized information.

creating opportunities to mix knowledge and expertise produced by fellow shelter residents with knowledge about services from the shelter staff and other institutional sources. These are some of the ways literacy comes into the frame as it highlights both the consumption of information (reading) and the production of information (writing).

1.2.3 Legitimacy

Where legibility and literacy frame my investigation around how technological interventions impact expression and action within a social space, *legitimacy* speaks to the socially constructed status of the provision and use of technology. One of the side effects of the rapid adoption of ICTs in both public and private sectors is the implication ICT adoption has on the right to access information and services. For public services, like welfare and disability entitlements, the public has the *right* to these services, yet when they are bound up in systems that require technology to access (like online registration, search, and verification), then arguably, access to facilitating technology should also be a *right*. Laptops and mobile phones, however, have evolved as devices that confer a level of status and privilege. Even for the homeless, the status signified by the mobile phone plays an important role in identity management, and transforming access-as-privilege to access-as-right creates tensions in the assessment signals of social membership and the legitimacy conferred by that membership (Donath, 1999).

So here, the question derived from considering legitimacy of use is: *What different interpretations of legitimacy arise through the use of a technology?* This question is meant to provide insight into the situated constraints present when designing technologies for the urban homeless. Within the purview of the work I am proposing here, the question of legitimacy is expressed through several mechanisms. One of those mechanisms can be found in how the mobile phone is used to help manage the presentation of self (Le Dantec & Edwards, 2008a). Mobile phones are used by the

homeless as social tools to *mitigate* the stigma of being homeless when interacting with family and friends, yet possession of a mobile phone can also *exacerbate* that same stigma with the public at large because the legitimacy of a homeless person owning a mobile phone is not universally accepted.² Another mechanism lies within the tensions in social service organizations that define legitimate access to information. One side of the argument is that services are most effective when mediated by a case manager, while the other is that increasing the homeless' access to information is empowering and will encourage self-sufficiency.

This larger issue of legitimacy plays out in multiple ways within my primary research site and effected relationships within the staff, within the residents, and across the two social boundaries. Issues of legitimacy—the legitimacy of sharing different kinds of information, or of using the technology for mediating different kinds of personal interaction—were an important mechanism in how the Community Resource Messenger was used, how the staff perceived it as useful (and disruptive), and how the residents experienced it as a way to consume and produce information.

1.2.4 Legibility, Literacy & Legitimacy within a Public

The framing of my research around legibility, literacy, and legitimacy developed from the early empirical work and was chosen for the ways each aspect afforded a way to engage different tensions within the context of homelessness. Each question allowed me to ask, separately, about the different influences and outcomes of technology on the urban homeless and how such socio-technical relationships might develop and impact relationships between the homeless and their care providers. What became clear, though, was that legibility, literacy, and legitimacy were playing out within the constitution of different publics, in particular, the constitution of a public of shelter staff and the constitution of a public of shelter residents.

²<http://wonkette.com/406833/a-childrens-treasury-of-conservative-reactions-to-this-poor-guy-having-a-cellphone-near-michelle-obama>

This notion of multiple publics comes from Dewey (1954 [1927]) where he developed the idea that a public is a group of people who face a particular set of issues and then take action to achieve some desired outcome with respect to those issues. With this definition of a public, there are a number of things that must occur: common issues need to be articulated, desired outcomes need to be identified, and collective action needs to be taken. In addition, as Dewey notes, there are multiple publics, and I argue there are two primary publics within my primary research site: the staff and the residents. With the plurality of publics comes a need for different publics to interact with each other, to communicate and interpret different issues and ways of engaging those issues.³

The framing of publics integrates the issues of legibility, literacy, and legitimacy with respect to the articulation of issues, the identification of desired outcomes, the action take to reach those outcomes, and the relationship between different publics as these occur:

- **Legibility** addresses how technology supports constituting and mediating a public by foregrounding the recognizability and relevance of a technology, and the how that legibility impacts participation with a technology.
- **Literacy** brings to the fore the ways publics interact with information production and consumption and how they identify and articulate common issues.
- **Legitimacy** describes the tensions within and across publics with respect to notions of information production, appropriate use of technology, and how social boundaries are enacted via technology.

³A complete discussion of Deweyan publics is presented in Chapter 7 where I return to the original text of Dewey (1954 [1927]) and connect several contemporary threads in Science and Technology Studies (STS), HCI, and Participatory Design (PD) around the role of technology as mediating the articulation of issues and catalyzing action in the constitution and support of publics.

The notion of publics reconfigures the broad question of “how we design for marginal communities?” by placing an emphasis on the way technology supports action and interaction in a larger social ecosystem. As I present the empirical work, I will develop answers and insight into the way legibility, literacy, and legitimacy come to bear on how technology is currently used and how it impacted and evolved through the deployment of the Community Resource Messenger. Deweyan publics provides a way to identify different political loci present in my primary research site and scaffolds how the interaction and configuration that occurs between these loci and the Community Resource Messenger.

1.3 Contribution

Beyond the scope of the homeless in Atlanta, my research questions, and particularly the notion of Deweyan publics help uncover the social mechanisms needed to appropriately situate technology innovations aimed at marginal or dispossessed users. My assertion here being that technology designed for uncommon users—like the urban homeless—must be tuned to the on-the-ground-practices in order to have any significant impact on the legibility of the technology or the literacy of its users. In fact, legibility and literacy are intertwined throughout my research, building on each other through the legibility of the mobile phone as a relevant technology and the literacy of the shelter residents in engaging and identifying with information presented both through their phones and through the public display connected to the Community Resource Messenger.

This intertwining plays an important role in the constitution of a public and the “infrastructuring” that occurs with the technology (Ehn, 2008b; Star & Ruhleder, 1996; Star & Bowker, 2002). In essence, the incorporation of the Community Resource Messenger in shelter life created a socio-technical resource for accomplishing the changing goals and needs of shelter residents as they establish relationships with

the staff and work toward independence. The framing of Deweyan publics allows for an account of the dynamic and fluid nature of the issues being addressed at a given time with a given set of actors (the staff and residents at my primary research site) and provides a lens through which to assess and make sense of how the Community Resource Messenger was adopted and used by different configurations of staff and residents during the course of the deployment.

The contribution of my work, then, has two components: the role of legibility, literacy, and legitimacy which foreground a set of tensions and outcomes to be examined through the deployment of the Community Resource Messenger; and the development of the pragmatist framework of Deweyan publics as a way to frame the participatory design of the Community Resource Messenger and which integrates the issues of legibility, literacy, and legitimacy into the larger socio-technical setting of my primary research site where individuals and institutional goals are co-mingled. By answering the questions above and furthering the the relevance of Deweyan publics to the design of ICTs, I am setting the foundation upon which the specific responses developed through the course of working with the urban homeless will inform a more generalized approach to design for communities of uncommon users other than the urban homeless.

CHAPTER 2

RELATED WORK

In the U.S., as in other Western nations, new forms of ICTs are rapidly changing how we engage with each other (*e.g.*, Grinter & Eldridge, 2001; Nardi et al., 2004; Reingold, 1993). These new technologies pose great opportunities for HCI research, especially in domains well beyond the workplace origins that ground the majority of HCI methods. This shift has resulted in a broadening of how we both design and evaluate technology: no longer are efficiency, usability, and productivity the only metrics we use to understand ICTs within contexts such as the home (Bell et al., 2005; Blythe & Monk, 2002), the place of worship (Wyche et al., 2006, 2008), or even the developing world (Chetty & Grinter, 2007). Ultimately, these new research venues have opened up new ways of understanding how we encounter ICTs and how those encounters shape our modern world (DiSalvo & Vertesi, 2007; Dourish, 2004; Höök et al., 2008; McCarthy & Wright, 2004; Sengers et al., 2005, 2004, 2006).

Yet as these new forms of experience with technology have flourished, it has become apparent that there are deep challenges in reaching certain user communities, and increasing concerns about marginalization of users without access to those technologies (Chakraborty & Bosman, 2005; Jackson et al., 2004; Kvasny & Keil, 2006; Selwyn, 2003). This gap between those with access to technology and those without access gives rise to popular concept of the digital divide. Most commonly described in conjunction with geopolitical boundaries, the digital divide also exists with developed nations like the U.S. (Chakraborty & Bosman, 2005).

2.1 Research at the Digital Divide

From a scientific and methodological perspective, working across the digital divide is compelling because it highlights how technology developed in support of corporate work practice is often incongruous to the needs, preferences, and capabilities of users with limited exposure to ICTs. Examining this mismatch does two things: first, by carefully studying the technology needs of users on the other side of the digital divide we add to a growing body of situated and contextualized understanding of technology use (Brewer et al., 2006; Le Dantec & Edwards, 2008a; Ramachandran et al., 2007); second, such studies give rise to technical and methodological innovation that reflect the preferences, needs, and experiences of these non-corporate settings (Cogburn, 2003; Dray & Siegel, 2003; Kam et al., 2006; Marsden, 2003).

Where research engaging the digital divide internationally has brought technical and methodological advances, the body of work focused on the domestic digital divide has been primarily concerned with issues of access to existing technologies (Jackson et al., in press, 2004; Van Tassel, 1991). The focus on providing access to the economically and educationally disadvantaged arises from approaching the issue as a policy or social problem rather than as first-order technology problem (Fallis, 2003). For example, in the Creating Community Connections system that was rolled out in a partnership between Massachusetts Institute of Technology and Camfield Estates (a re-developed low-income community in Massachusetts), the technology and services provided were not tailored to the user's needs so much as they were existing technologies that were provided at no cost and with on-going training (Pinkett, 2000; Pinkett & O'Bryant, 2003). Pinkett (2000) admits that one of the challenges in providing technologies to communities—poor or not—is that “computer technology, given its inherently flexible nature, does not immediately suggest a particular benefit or use, because it can support a variety of aims.” While Pinkett goes on to attempt a holistic

approach to developing computing capacity within a poor community, the root challenge of closing the gap between user’s perceptions of how a technology might impact their lives and the perception of that impact from the organizations providing those resources remains.

This challenge, of aligning modes of use with outcomes that have lasting impact on the users and communities that receive technology has existed for some time. Kvasny & Keil (2006), in a study that examined the utilization of technology centers in two different lower-income neighborhoods, found that after initial excitement wore off, use of the technology centers dwindled. The failure mode at the community technology centers revolved around the gap between the expectations and the reality of using computers. The skills taught at community technology centers do not always directly align with the skills needed to create or advance employment opportunities, a mismatch that erodes the incentive to use technology. The challenge here is that these community technology centers, while providing Internet access and learning opportunities with common software packages, need to do more to contextualize technology use, to create a social infrastructure around the technology so that it can be better incorporated into the community’s ideas of how to identify and act on the opportunities technical literacy affords.

Social infrastructure is only one of the infrastructure issues facing the digital divide. Traditionally, it has been material infrastructures—the absence of a robust and dense power grid, fixed-line telephone network, or other data-capable backbone—that has received the most attention. Some of these efforts have looked at ways to put in place new forms of infrastructure (Agarwal et al., 2008; Anderson, 2005; Cervantes & Sambasivan, 2008; Pentland et al., 2004), while other efforts have attempted to develop applications that work within the existing constraints of a spartan physical infrastructure (Kumar et al., 2008, 2007). The fallout from the infrastructure problem in developing regions of the world is a bifurcation of technology research into either

focusing on developing cost-effective infrastructure options that provide analogous capabilities to those found in developed regions (such as DakNet (Pentland et al., 2004)), or focusing on developing applications that can be supported by existing infrastructure (such as VoiAvatar (Kumar et al., 2008)). The unmet challenge in this approach is the lack of forward-looking work that examines the kinds of novel and culturally situated advances can be made when both infrastructures and end-user application are considered in concert—that is, by considering the *socio*-technical, rather than just the technical.

Given these challenges, there is a unique opportunity gained by focusing on the domestic homeless population to explore the individual, cultural, and physical constraints on technology. Lower rates of literacy (U. S. Department of Housing and Urban Development, Office of Community Planning and Development., 2007), a marginalized social position with respect to the mainstream (here domestic; in developing regions, international) (Chatman, 1996; Conley, 1996), and characteristics that delineate unique cultural boundaries all mark the need for developing a careful understanding of how these attributes impact, and are impacted by, new technologies. These issues can be approached in the U.S. while relying on existing and robust infrastructure, enabling a careful paring back of sophisticated capabilities to those more accessible to uncommon users.

2.2 A Portrait of The Homeless

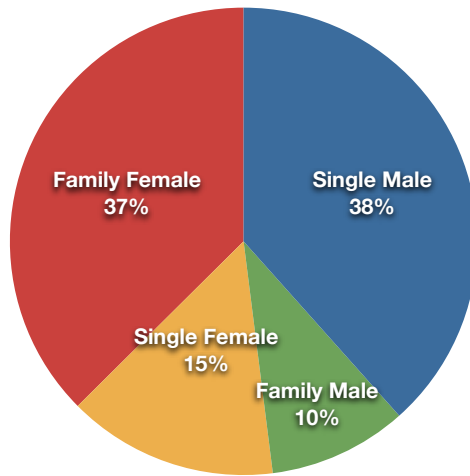
The U.S. Government defines homelessness in the Stewart B. McKinney-Vento Acts, 43 U.S.C. § 11201, et seq. (1994) as any person who:

lacks a fixed, regular, and adequate night-time residence and...has a primary night time residency that is: (A) a supervised publicly or privately operated shelter designed to provide temporary living accommodations... (B) an institution that provides a temporary residence for individuals intended to be institutionalized, or (C) a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings.

This definition of homelessness focuses the attention of social services on a segment of the population who have what can best be described as a significant lack of stability in their living arrangement. Yet while the McKinney-Vento Act clearly spells out a definition of homelessness, it excludes many individuals and families who are without housing yet do not meet the definition of homelessness, and are thereby excluded from the under the umbrella of social services meant to provide help. In particular, individuals who stay with friends, or who are staying at motels or other low-cost but temporary dwellings are not covered by the definition and fall outside the purview of social services. These individuals fall between the cracks despite the similar lack of domestic stability. The impact of this marginalization is that for the episodically homeless—*e.g.*, those who are homeless from job loss—there are far fewer sources of aid to be had to prevent crisis (when it can arguably be more effective) than there are post-crisis. A compounding factor here is that the homeless population has been changing over the past 30 years to the point where the canonical homeless male is no longer the primary homeless persona. Instead, less than half of the homeless population, nationally, is comprised of single men, the greater portion is made up of single women, families, and single mothers (see Figure 1) (Axelson & Dail, 1988; Pathways Community Network and the 2009 Homeless Census Advisory Council, 2009; U. S. Department of Housing and Urban Development, Office of Community Planning and Development., 2009). In the state of Georgia, however, single male homelessness remains the largest segment of the population.

In the 1980s, the homeless population grew dramatically due to a number of converging factors. Urban revitalization and development reclaimed skid rows and reduced the available low-income housing typically used by the urban poor (Shlay & Rossi, 1992); federal aid for housing was cut through the 1980s, reducing the number of housing vouchers granted from 175,000 to 20,000 a year (Dreier, 2004); local laws for public drunkenness, loitering, and nuisance began to change in the 1970s and

U.S. Sheltered Homeless Demographics



Georgia Sheltered Homeless Demographics

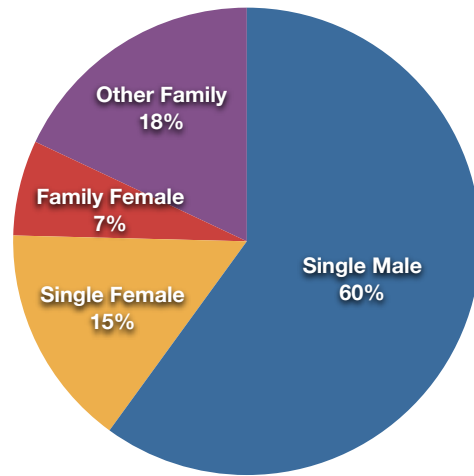


Figure 1: Homeless demographics, U.S. and Georgia, data from Pathways Community Network and the 2009 Homeless Census Advisory Council (2009); U. S. Department of Housing and Urban Development, Office of Community Planning and Development. (2009)

meant that a greater number of individuals who would have been carted off to jail in past years were left on the streets (Shlay & Rossi, 1992). The combination of these factors created a more visible homeless population and subsequent national awareness of the problem.

Despite strong economic growth in the U.S. through the 1990s and the early 2000s, the homeless population did not decrease in size (Shlay & Rossi, 1992). The reasons for this are not clear; however, some evidence points to economic growth actually contributing to homelessness, as property values rose faster than wages (Logan & Molotch, 1987). Furthermore, through the most recent economic boom fueled by the technology sector, the growth experienced was in high-skill and high-paying jobs; little growth was experienced in the segments of the economy that are associated with the working poor and homeless. These factors colluded to place increased economic stress on the working poor and cause a slight increase in homelessness (Tompsett et al., 2006).

In contrast to the causes of single-male homelessness—primarily attributed to addiction disorders and mental illness (Shlay & Rossi, 1992; Spradley, 1970)—homeless

families are more likely driven to homelessness due to economic hardship (Axelson & Dail, 1988). They typically come from the “extremely poor” who live below 50% of the poverty line and represent the episodically homeless (Tompsett et al., 2006). For homeless families, compounding factors such as domestic violence, health problems, and managing care for young children complicate obtaining stable housing (Danseco & Holden, 1998).

Despite the variety of factors contributing to homelessness, poverty and the lack of available low-income housing are the most common reasons for homelessness, and are shared by most of the homeless population. In some urban areas the lack of affordable housing precludes even the working poor from maintaining a residence; individuals have jobs and are “productive” members of society but are still unable to secure housing (Gerena-Morales, 2007). The reality is that many homeless, while poor and lacking stability, are not in fact, jobless (Yates, 2008).

Studies of homelessness in other industrialized countries show that a number of contributing factors to homelessness are common regardless of nationality or economic system. When comparing homeless and domiciled poor in Madrid, Muñoz et al. (2004) described traits common to both sides of the Atlantic: low education levels, high unemployment rates, and pervasive mental and physical health problems. Likewise, in a study of the London homeless population, Radley et al. (2005) addressed the complex relationship homeless individuals have with their urban domain. The multi-faceted causes of homelessness and the complex interaction with the urban environment described by these studies were all present in data collected in my own research (Le Dantec & Edwards, 2008a).

2.3 Technology & The Homeless

The factors that disadvantage developing nations and lead to a digital divide are also present among the homeless and poor populations in industrialized nations

(Chakraborty & Bosman, 2005). Lower levels of education and literacy restrict access to information, a lack of economic independence restricts access to PCs and Internet resources, and limited access to training hinders uptake of digital technology when it is made available (Kvasny & Keil, 2006).

These factors are often cited as leading to both economic poverty and what has been called information poverty—a dearth of access to useful information resources (Chatman, 1996). In the case of the urban homeless, the environment also plays a role vis-à-vis the socialization that occurs on the streets, generating a context where it is increasingly difficult to get off the streets (Conley, 1996; Snow & Anderson, 1987).

Based on this view of information poverty, one might aim to provide design innovations—both social and technical—that allow homeless persons access to the information that they are lacking. However, the existence of this claimed state of information poverty is debatable (Hersberger, 2001). Hersberger found that instead of perceiving themselves at an information disadvantage, “If anything, [those interviewed] felt they might be suffering from information overload due to the propensity of service providers to share information [about relevant social programs] with them” (Hersberger, 2001). Hersberger questions “how valuable and useful an information-seeking tool the Internet would be in the everyday lives of homeless families” given they already feel overwhelmed by information received primarily through case-workers and word-of-mouth communication (Hersberger, 2001, 2002/2003). The challenges of coping with information overload have been borne out in another study of the information ecology in teen-focused care providers (Woelfer et al., 2008).

The implication in Hersberger’s and Woelfer’s work is that it is not simply access to technology and information that determines the impact on these marginalized users. Information is reaching the homeless community in overwhelming volumes, yet social factors discourage acting on that information. The specific constraints placed on the homeless population put a higher premium on the larger context in which

information is situated (Alexander et al., 2005; Hersberger, 2005). Ultimately, the concern is not merely the availability of and access to information, but ensuring that information is sensitive to the social context of those who receive it.

2.4 HCI & The Homeless

The HCI research community has only begun to directly address homelessness (Le Dantec & Edwards, 2008a; Le Dantec, 2008; Le Dantec & Edwards, 2008a; Robertson & Nardi, 2010; Woelfer et al., 2008), and where it has done so, relies on frameworks that have emerged in the last few years that ask questions of the larger social world in which technology is used (Friedman et al., 2006; Le Dantec et al., 2009; Nathan et al., 2008). Each of these researchers have used human values as the lens through which to explore and address the technology issues of the homeless.

To some degree, the conversation about values in information technology started with Suchman (1997) and her critique of formal systems used to support knowledge workers. Contemporary HCI research has taken these concerns and integrated them with social-constructivist frameworks like Social Shaping of Technology (SST) (Williams & Edge, 1996), and Socio-Technical Interaction Networks (STIN) (Kling et al., 2003), and with positions advocating social impacts of research, such as Action Research (Avison et al., 1999). The upshot of developing these different modes of inquiry and reflection on technology is that HCI research has become more focused on the social context of technology, rather than just on the technology itself.

The issue of values in the design of technology has been churning in the HCI community for several years. Most notably, the Value Sensitive Design (VSD) framework has been promoted as a comprehensive attempt at setting out both a philosophically grounded approach to values, outlining ethical guides for reflecting on technology use in myriad contexts, as well as providing a collection of methods to integrate those values in an iterative design process (Friedman, 1996; Friedman & Kahn, Jr., 2003;

Friedman et al., 2006). By focusing on human values, VSD enables a move away from the assumptions of simple usability and efficiency that lie at the core of many traditional HCI methods. In this regard VSD, SST, and STIN are similar as they all emphasize the interplay between the development of a technology and the socio-technical system that gave rise to, and eventually adopts that technology (Friedman & Kahn, Jr., 2003).

Despite the guidance VSD provides for incorporating values into an iterative design process, it also poses significant hurdles. In particular, the deontological moral philosophy at the heart of VSD invites a kind of moral colonialism by privileging values that “have moral epistemic standing independent of whether a particular person or group upholds such values” (Friedman & Kahn, Jr., 2003). While a moral compass is important, particularly when developing software and systems that might be used far afield, the weight given to these “universal” values can obscure more local values (Le Dantec et al., 2009).

Beyond considering users’ values, it is also important to consider the non-users of a technology intervention (Cushman & Klecun, 2006; Selwyn, 2003). By examining non-users we can begin to understand the root causes for failures in adoption, and work to mitigate these causes; often these failures are not due simply to technical limitations, but rather to a lack of understanding of the social context into which technologies are deployed (Carroll, 2004). For groups like the urban homeless, access to technology (such as through community centers, libraries, or at social service providers) is only part of the problem; ongoing costs of ownership or subscription services, along with perceived value and opportunity, play significant roles in the social acceptance of different forms of technology and must be considered when exploring paths to adoption (Kvasny & Keil, 2006). Further, as mainstream society adopts an ever-increasing range of new technologies, the kinds of activities and access that define social legitimacy likewise change; simply being a non-user of these technological

advances is itself a marginalizing force. These factors contribute to the social exclusion of the homeless (as with the poor) and add additional barriers to their legitimate participation in society (Milbourne, 2006).

To that end, tools like cultural probes (Gaver et al., 1999), and MakeTools (Sanders, 2006), provide alternate ways of engaging a variety of social contexts where efficiency, productivity, and usability as traditionally defined by HCI are not well-suited forms of evaluation. These kinds of tools also provide ways to recognize users and non-users in rich social contexts, and aim to provide designers the material they need to respond to ambiguity when a number of different communities converge in such contexts (Gaver et al., 2004). Research agendas built around such tools are intrinsically focused on PD and their use marks a move within HCI toward providing end users not just with a packaged solution but with the tools necessary to collaboratively build appropriate solutions for themselves.

2.5 CSCW & Social Service Providers

While Computer-Supported Cooperative Work (CSCW) and related fields have a long history of examining diverse work environment, from for-profit office work (Putnam, 1983; Rouncefield et al., 1994; Suchman, 1983), to the control room (Heath & Luff, 1991; Hughes et al., 1992), to clinical settings (Hartwood et al., 2003; Symon et al., 1996), one area that has seen less consideration in the CSCW canon is the study of private, nonprofit social service organizations; though, some recent work is beginning to explore the unfamiliar terrain of ICTs in the nonprofit (e.g, Stoll et al., 2010; Volda et al., 2011). Such organizations present a unique set of needs and constraints for three important reasons; first, they are often working under very tight financial constraints that affect long-term technology planning and access to technical expertise; second, nonprofit organizations depend on volunteers to fill critical roles in day-to-day operation, creating a cooperative dynamic that differs from organizations where all

work is done by paid employees; finally, private nonprofit social service organizations find themselves in competition for grants and other public funding, thereby affecting some of the ways they might collaborate in developing and providing programs of service as they are often competing for the financial resources.

2.5.1 The Nonprofit Ecosystem

The designation “nonprofit” refers to a tax exempt standing under U.S. tax law, defined in Section 501(c)(3). Such organizations often do generate profit but those earnings may not be distributed to shareholders or individuals; rather, they are required to be reinvested into supporting the charitable services the organization provides. Nonprofit organizations play a critical role in providing services to many communities across the U.S. and the world. These organizations are privately held and range in size and reach from organizations like the Bill and Melinda Gates Foundation to the smallest community church.

While private donations to charitable organizations in the U.S. are considerable (United Nations Office for Partnerships, 2007), the historic perception of abundant government support for social welfare has traditionally driven much of those private funds toward other charitable causes like disaster relief, health programs, and environmental protection (Salamon, 1999; Roberts, 1984). This legacy exacerbated already existing hardships for nonprofit social service as the climate of government welfare support changed in the 1980’s: the first declines in public funding for welfare programs since the Great Depression were happening while the population of individuals needing those services was growing (Dreier, 2004; Salamon, 1999). As private funds were still largely focused elsewhere, nonprofit social service organizations were faced with having to provide service to a growing population of poor and homeless with fewer resources and less support from government agencies (Salamon, 1999).

These changes have had two significant effects on U.S. nonprofits. First, the need to generate revenue has opened the door for business practices borrowed from for-profit practices. One example of this can be seen in mega-churches in the U.S. where management structures and a focus on brand and growth have transformed the way these organizations interact with their communities (The Economist, 2005). While mega-churches might be an extreme example, the need for nonprofit organizations to become more efficient in their operations and broader in their approach is pervasive in the U.S. (Salamon, 1999).

A secondary effect of emulating for-profit enterprises comes via pressure to adopt technologies to achieve measures of efficiency and a more rationalized business practice. This in turn has led to many technologies and techniques studied by CSCW in for-profit work contexts making their way into the nonprofit sector, including advocacy of ICTs in support of communication and collaboration (Merkel et al., 2007) and the maintenance of electronic clinical records (*e.g.*, as advocated in Hartswood et al., 2003; Reddy et al., 2001).

2.5.2 Technology & the Nonprofit

With respect to technology's place in the nonprofit, Merkel et al. (2007) assert that ICTs can play an important role; from aiding in volunteer recruitment, amplifying public relations and fund raising activities, to improving internal information management, the use of ICTs has great potential for nonprofit organizations. Much of this work has variously focused on how ICTs might amplify the efforts of nonprofit organizations (*e.g.*, Goecks et al., 2008; Merkel et al., 2007), on the potential impact of ICTs for public engagement with government and democratic process (*e.g.*, Becker, 2001; Taylor & Burt, 2001), or on ICTs' ability to provide access to complex data sets that would otherwise be impossible to collect and manage (*e.g.*, Dawes & Pardo, 2006; Snellen, 2001; Weiss et al., 1986). The driving force is an expectation that the

transformations that accompanied ICT adoption in the private sector can be brought to bear on public institutions: from creating more efficient public bodies, to increasing participation, to providing better information to policy makers.

Yet despite these potential gains, ICTs are often underutilized. At the center of this underutilization lies the simple fact that nonprofit organizations are resource constrained in ways that many for-profit companies are not: budgets for technology and training are often limited, as is access to personnel with technical expertise (McPhail et al., 1998; Merkel et al., 2007, 2004). As a result, the technology in place is often approaching obsolescence and is poorly suited to supporting long term organizational needs and growth. This further frustrates a positive perception of ICTs and their ability to play a useful role within nonprofit organizations (Carroll & Farooq, 2007); in a study of Canadian volunteer organizations, less than half of the respondents viewed ICTs as having a positive impact on their service, recruitment, and management activities (Harrison et al., 2004).

The dependence on volunteerism is another key aspect in the operation of nonprofit organizations that plays an important role in the adoption of ICTs as well as in the nature of the cooperative work that takes place. Volunteers have a variety of backgrounds and expertise that complicates the introduction and maintenance of technology. Additionally, high turnover in the volunteer workforce often means knowledge is not preserved from one group of volunteers to the next, compounding the difficulties of developing a long-term view on the role of ICTs for the organization. Carroll and Farooq explicate these tensions as a problem of control over ICTs (Carroll & Farooq, 2007); volunteers typically expect more task autonomy than paid staff (McPhail et al., 1998), and the combination of conflicting motivations and highly constrained resources make it difficult to cultivate the expertise necessary to support sophisticated use of ICTs within these environments.

While it can be argued that the introduction of for-profit workplace practices and technologies may be a herald of better times—increased efficiency and better support of collaboration and knowledge work—there remains a constant struggle for nonprofit organizations to keep pace with an increasingly digitized and interconnected information landscape.

The challenge is three fold: first, limited resources do not afford access to best of breed ICTs and stifle access to expertise; second, high turnover within the voluntary workforce raises the organizational cost of creating and preserving the knowledge necessary to make effective use of deployed ICTs; and third, as noted in the study of Canadian volunteer organizations (Harrison et al., 2004), these technologies can be disruptive to the work of providing social services and can create imbalances between those who receive the benefit of new technologies versus those who must do the work of using them—a critique pointed out previously within CSCW in for-profit contexts (Grudin, 1988; Kling, 1991).

2.5.2.1 Homeless Outreach & Care-providers

Within this landscape of nonprofit and community volunteer organizations, those that focus on serving the homeless are a particular sort. They are often the last lifeline for individuals facing dire circumstances and in need of immediate and on-going aid. The services provided to the homeless population are focused on basic needs, and the organizations rely heavily on volunteerism and often have strong relationships with a network of other private nonprofit organizations in the community—both as a way to source funding and material needs (temporary housing, clothing, etc.), but also as a source for their volunteer workforce.

The variety of conditions that are labeled as “homeless” gives rise to a wide range of nonprofit organizations that aim to serve various segments of the homeless community (Axelson & Dail, 1988; Hersberger, 2005; Tompsett et al., 2006). The

services these organizations provide range from emergency housing, to job training and placement, to financial aid for rent and utilities, to childcare, healthcare, and legal counsel. Service providers are a mixture of grassroots and nationally affiliated organizations committed to identifying and ministering to individuals whose needs are not being met through other sources. It is often the case that no single organization provides all the services a homeless individual may need. As homelessness is often accompanied by a number of social, physical, and psychological needs that may require attention, aid from multiple specialized organizations is necessary to gain access to healthcare, addiction treatment, employment services, and—for the growing number of single-parent females among the homeless population (Axelson & Dail, 1988)—childcare services. This distribution of services across many organizations means, in turn, that these disparate organizations must coordinate with each other on a case-by-case basis to ensure effective delivery of services.

In contrast to the more traditional workplace venues that have been examined in CSCW, this need to coordinate *among* organizations, not just *within* them, is imperative for providing service to the homeless. While individual clients have a responsibility and a role to play, effective coordination also requires technical and managerial systems on the part of the centers to ensure equitable (and, often, legally regulated) distribution of service. This coordination, commonly in the form of client referrals, has to reach across organizations, their individual charters, missions, and organizational structures if it is to provide real value to the client and not simply act as a “low cost way to [for service centers] to process clients” (Lipsky, 1980, p. 132).

2.6 The Public Sector as a Scale-crossing Context

In addition to the internal work of providing social services, nonprofit service organizations also engage in a considerable amount of cross-organizational work. A useful way to conceive of the cross-organization work that takes place in the nonprofit sector

is as work that occurs across *scales* (Le Dantec & Edwards, 2010). Scale, in this context, directly addresses the organizational and institutional boundaries of *influence* and *accountability* present within the social service ecosystem. In particular, the notion of scale is a way to address the consequences of hierarchical accountabilities and distinct spheres of influence that arise from complex cooperative systems with large numbers of users (across independent organizations), and long lifespans (as tools for enacting public policy), and whose use encompasses communities that cross local, regional, and national contexts.

This definition of scale differs from other studies that have looked at systems at scale—singly defining scale as a metric for the number of users of a particular system (Zimmerman & Finholt, 2007), or as the lifespan of a system (Ribes & Finholt, 2007), or via the disperse communities that the system encompasses (Mynatt et al., 1998). Within these different domains, despite the size, reach, or lifespan of the systems and organizations involved, the contexts studied have involved settings with bright-lined boundaries around what the cooperative work is, with whom it is accomplished, and on whose behalf. In many cases, both the effort that goes into using cooperative systems and the reward to be gained from their use co-exist within single settings, such as a single enterprise; however, well-known examples have documented how the work and benefit often fall to different individuals even within these monolithic settings (Grudin, 1988; Kling, 1991).

The public sector is one environment where cross organizational use of ICTs is common. Within the public sector exists the conjunction of governmental bodies and nonprofit agencies, each implicating different organizational scales in the conception and deployment of technologies meant to support the implementation of public policy (Bardram, 1998). While scale crossing does exist in other contexts—recent work in cyberinfrastructure shares some of the same challenges where diverse and loosely confederated organizations need to develop complex computing solutions to support

their work (Ribes & Finholt, 2007; Zimmerman & Finholt, 2007)—the challenge of crossing scales is *central* to work in the public sector.

There are three characteristics that make scale crossing endemic in the public sector: upward accountability, lateral cooperation, and internal work practice. Upward accountabilities come by way of mandated reporting requirements from a variety of government, regulatory, and funding agencies. Lateral cooperation is necessary as nonprofits often form “silos” of single service, implicating multiple agencies in care provision and requiring them to repurpose information systems in order to facilitate coordination. Finally, internal work practice comes to bear as the same information systems used to collect data (for upward accountabilities) and coordinate care (for lateral cooperation) are intended to support day-to-day case management.

While ICT adoption and use in the public sector is certainly governed by factors such as dynamics of power, organizational politics, and work/benefit disparities, there are additional constraints, some of which run counter to assumptions made about how ICTs might be applied in the public sector. In particular, the necessity for collaborative systems in the public sector to cross scales creates specific challenges that have yet to be adequately addressed: beginning with the individual who needs services or information, to the nonprofit providing those services and information, to municipalities serving a diverse population, to state and national government agencies who coordinate those services, and finally to the policy makers and administrators who are attempting to address social needs.

2.6.1 ICTs, Nonprofits & Scale

Within the context of the nonprofit, the use of ICTs has centered on activities and accountabilities that connect to different scales (Goecks et al., 2008; Harrison et al., 2004; Merkel et al., 2007). Management practices can be internally focused, but may also come from external pressure to increase efficiency in the organization; volunteer

relations speak directly to the community the nonprofit exists in; and fundraising activities expose the organization to a range of external accountabilities as funders exert influence via the pocketbook.

The boundary between the public sector and the nonprofit blurs with respect to the provision of social services, and the presumed role of ICTs ranges from aiding on-the-ground work practices at individual nonprofits, to conduits for collecting data for information policy makers. The bureaucracies and policy setting organizations that operate state- and nation-wide programs are increasingly directed to develop their programs in response to real data. Yet this position is fraught with issues that inherently cross scales. As Sarpard (2003) points out, the issues are centered around “*who* will control and have access to the information, and *how* can government leaders utilize the data to increase the effectiveness of governing and thus, improve the common good” [emphasis hers]. Embedded in these two questions is a concern about whether that data would be used to more evenly distribute limited resources or to manipulate social and economic divides.

An additional challenge with the drive for more data is the collection of accurate data. Such data collection requires the input of stakeholders across several scales, and must work within an environment where service provision, not data collection, is the primary focus of the organization (Dawes & Pardo, 2006). The work of collecting data is often complicated as the nonprofit points of service are constrained by a lack of technical capacity. Furthermore, systems are mandated by bureaucracies and administrators who are far removed from the day-to-day operations of service provision. This in turn leads to a mismatch of expectations between potential gains from data collection and ICT adoption and the disruption to work practice for case managers and service providers (Carroll & Farooq, 2007; Gutierrez & Friedman, 2005; Le Dantec & Edwards, 2008b).

The impact these factors have on how organizations adapt their practices for upstream accountabilities is amplified by two factors. First, systems used in the public sector come by way of mandated rather than voluntary programs. Second, there is a more guarded stance taken between different providers is intertwined with rifts that are present across organizations including: opposing philosophies on how to provide aid, coping with limited and transient technical expertise, protecting the people they serve and how they are represented to authorities in shared databases, and ultimately competing with each other for funding and legitimacy vis-à-vis how they are funded and whom they serve (Le Dantec & Edwards, 2008b).

2.6.2 The Role of HMIS in Crossing Scales

Not all systems that are designed for the nonprofit will, or need to, cross scales. However, there is a class of ICT—broadly referred to as Homeless Management Information Systems (HMIS)—that have this characterization and are situated across the boundaries of multiple organizations: specifically, those systems that roll up data from direct service providers for public accountability and policy setting. HMISs expose some of the unique challenges that arise in the nonprofit sector and how such systems are implicated in the work of many agencies and organizations: systems put into service to collect data are mandated based on the government’s need for accurate information but must be used at direct service outlets where limited technical capacity affects use, where the relationship to regulatory infrastructure affects how data collection is perceived and carried out, and where direct service and not data collection is the primary concern.

In the U.S., the widespread adoption of HMIS software did not begin until 2003 as part of policy changes initiated by the Department of Housing and Urban Development (HUD). Up to that point, no systematic reporting of homeless social services

was being done, meaning there was no way to reliably measure the efficacy of programs or to enforce accountability for how funds were being distributed at service providers across the country. To address this issue, the U.S. Congress mandated, via HUD, the collection of service data in electronic form (Sarpard, 2003). In many instances (Le Dantec & Edwards, 2010; Le Dantec & Edwards, 2008b), the HMISS in use attempt to provide support both for mandated data collect—that is, work to support the national scale—and working case notes and coordination needs that occur at the point of service provision.

While the HMISS in use theoretically support these different kinds of work, the way such scale-crossing applications might be adopted by an organization is not well understood because much of the previous work on how organizations adopt and arrange themselves around technology has been focused internally to understand how how ICTs are involved in structuring work within organizations (*e.g.*, Orlikowski, 1992a, 2000, 2007). This work points out that use—“enactment”—of technology within organizations comes “in response to various technological visions, skills, fears, and opportunities, influenced by specific interpretations and particular institutional contexts, and shaped by a diversity of intentions and practices to collaborate, solve problems, preserve status, improve efficiency, support work processes, learn, and improvise” (Orlikowski, 2000). However, the underlying position takes as given that these factors are contained within a single organization at a single scale. Likewise, in Markus (1983) the analysis of resistance toward ICT adoption is predicated on internal organizational perspectives and assessing how different groups within the organization position themselves alongside new technologies introduced to affect organizational change.

For work in the public sector, these analyses fall short as the ICTs deployed are done so across scales rather than within scales. One way to understand this is that

in both Orlikowski's and Markus' work, the organizations all share the same organizational chart—regardless of how large or convoluted that chart might be. This constitutes a single scale. In contrast, the kind of work done at a nonprofit social service provider comprises many organizations whose organizational charts remain distinct. As a result, they exhibit different tensions in how accountabilities are managed and how work practices are modified based on assumptions of how different external organizations will use the shared system and interpret the work represented in it. Most importantly, these organizations exhibit very different constraints in how information moves up and down the scales.

CHAPTER 3

METHODS

Throughout my research, I have adopted and adapted a range of qualitative and design-based methods in order to better understand the context of urban homelessness and the non-profit organizations upon which they depend. I would describe the research I have done, and the methods that I have chosen, as being people-led, rather than technology-led. Which is to say, instead of assuming a particular technology as a hypothesis, and testing that hypothesis against human constraints and capabilities, my primary concern is first understanding human and social constraints, and then co-developing a technology intervention based upon empirical evidence of opportunity and appropriateness.

My human-centered and empirical approach to developing interactive technologies weaves together several different intellectual traditions. The first set of intellectual traditions focuses on developing an understanding of the setting and social context. At the core, my work draws on phenomenological sociology (Schütz, 1967), as well as on perspectives from postmodern anthropology (Augé, 1995), and finally on frameworks that foreground the socially constructed and dynamic relationship between people and technology (*e.g.*, Bijker, 1995; Latour & Woolgar, 1979; Williams & Edge, 1996).

These different intellectual traditions provide a perspective on social and technical facets of contemporary life that argues for understanding the interplay between humans and technology: that technology neither solely defines nor is defined by humans, and humans neither solely define nor are defined by their technology; instead, each are shaped in relation to the other as a *socio-technical* system. As such, the methods that I have chosen seek to first develop insight into the social context, then

to engage stakeholders in the design of a technology intervention, and finally to study and reflect on the confluence of social and technical changes through the deployment of the technology.

To support my approach, the methods I enlisted can broadly be divided between three main areas:

1. **Fieldwork:** I used interviews, surveys and different forms of observation to establish an empirically based understanding of the homeless ecosystem in which I was working. This included research to understand the daily routines of a cross section of the homeless population as well as work done to understand the work context of non-profit social service providers.
2. **Design:** I used participatory and co-design methods for engaging different groups of stakeholders in the design of the Community Resource Messenger. The design work sought to engage staff and residents at my primary research site and to empower them to express the functional requirements of the system as well as value-based requirements that would impact how the technology fit into their routines.
3. **Assessment:** I used qualitative and quantitative evaluation methods for understanding how the Community Resource Messenger was adopted *in situ* at the shelter deployment site. The focus here was evaluating how the co-designed technology was adopted, the role it played in staff/resident communication, and in analysing changes that system adoption precipitated at the shelter.

My goal in interweaving these different methods was to achieve increasing resolution from conceptualizing some of the broader issues of technology within the context of urban homelessness to the specific and nuanced ways a bespoke intervention affected the staff and residents at the primary research site. The progression from ethnographic fieldwork to participatory design also provided practical checks against

carrying biased or misinterpreted findings from the qualitative work into the findings of the system deployment—a “constant validity check” that progressed through the entire process (Bernard, 2005, p. 453).

Because my research deals with a marginalized and socially at-risk community, it bears briefly acknowledging that working with the homeless has pronounced risks and ethical considerations (Ensign, 2003). As I developed my research, I took steps to mitigate known risks and to operate in a manner that was respectful of my participants. Broadly, this meant working with social service providers to mediate contact with the homeless: I relied on staff and case workers at my research sites to introduce me to their clients and to provide support for appropriately recruiting participants in the different phases of my research. Throughout the work, participants were free to excuse themselves from the research if they did not feel comfortable, and they were compensated for their participation as appropriate (with gift cards during interviews and with reimbursement for mobile phone usage or by providing phone service during system deployment).

3.1 Data Collection

The data I collected came from many sources: data from interviews, from survey instruments, and from direct observation; data from a design workshop, and from design sessions with the staff and residents at my deployment site; data from system logs and system instrumentation, as well as content from staff/resident communication conducted via the Community Resource Messenger. Table 2 at the end of this section breaks down which methods and instruments I used during each phase of my research (and which sites were involved with each phase). Copies of surveys and interview guides can be found in Appendix A.

3.1.1 Fieldwork

The mainstay of my data collection, conducted throughout all parts of my research, was based on fieldwork conducted at my various research sites. This fieldwork included forms of interview, different survey instruments, and forms of direct observation. I moved between methods depending on the immediate goals of the research phase and my need to triangulate findings at different sites or over different sets of participants.

3.1.1.1 Interviews

I conducted both *unstructured* and *semi-structured* interviews throughout my research (Bernard, 2005, p. 211). The reason I chose these forms of interview is that they shift control of the interview toward the participant—a characteristic I felt was important to incorporate due to the authority dynamic present when working with a marginalized community like the urban homeless.

At the outset of my research, when I was first working with the homeless, I used a semi-structured Photo Elicitation Interview (PEI) method (Clark, 1999; Clark-Ibáñez, 2004; Schwartz, 1989). PEI studies involve providing participants with cameras and instructions to take photos of their daily lives, and like other forms of diary study (Rieman, 1993), the participant generated materials—in this case the photos—are used as a resource during semi-structured interviews. The key benefits of using PEI, particularly with at-risk or marginalized participants, are that it enables the participant to retain more control over the interview; it enables deeper reflection on the topic by providing more context and peripheral data via the photos; and it provides opportunities for the participant to defamiliarize themselves with familiar aspects of their lives (Carter & Mankoff, 2005; Clark-Ibáñez, 2004; Harper, 2002). The PEI method has been used by other researchers working with homeless populations (such as the study by Radley et al. (2005) of the London homeless population, and is an

effective way to gain access to contexts that might otherwise be out-of-bounds to the researcher.

In my adaptation of the PEI, I asked participants to take photos that showed how technology impacted their lives. Not all participants took photos of technology, but because the interviews were framed around photos they had taken, I could broach the topic of technology in terms of the content and context provided in photos the participants shared with me. The grounding of the interview in the context of the participants' experience was important in developing the interview around a broad, and potentially unfamiliar topic like "technology."

I also used semi-structured interviews during my multi-site research with social service providers. The interviews I conducted followed a guide to cover a consistent set of topics across each of the providers but also allowed for provider-specific topics to come up during the interviews. As with the PEI method employed when working with the homeless, the semi-structured interviews were conceived to shift control of the interview to the staff and directors at my research sites so that topics and issues of interest to them—as experts in their domain—could be brought up through the interview process.

After the Community Resource Messenger was deployed to the staff and residents of my primary field site, I used a combination of semi- and un-structured interviews to inquire about the developing use of the Community Resource Messenger. Over the many weeks of system deployment I would revisit topics with both staff and residents, such as specific behaviors that developed or instances of communication or use that had transpired. As was the case throughout my research, the interviews I conducted were developed to help me gain insight into the social context around technology use—either existing practices, or those that developed around the intervention I deployed. As such, interviews needed to be open-ended and allow for topics and questions to

develop from the participants' experience rather than *a priori* notions about what those experiences might entail.

3.1.1.2 Surveys

My primary use of surveys was to gather demographic information from the homeless participants and to collect rudimentary data about technology use and familiarity as a coarse metric of technical fluency. These data served to provide a basis for developing areas of inquiry during interviews, or as areas to explore during design sessions.

During the Community Resource Messenger deployment, I used an additional survey instrument to assess the impact of the shelter program on the participating residents. I used the Family Support Scale (FSS) survey which is a questionnaire comprised of 18 Likert scale questions meant to measure the qualitative experience of different sources of family support (Dunst et al., 1984). The scale relates formal and informal sources of social support—school programs and physicians along with friends and extended family—and provides a metric against which to assess how connected someone is to the different sources of support around them.

The FSS was originally devised to provide a way to assess and predict social adjustment and well-being in families—the more connected a family was to diverse sources of support, the more resilient it was to hardship (Dunst et al., 1984). I used the scale in pre- and post-tests on mothers at my deployment site to gain an empirical basis for understanding how their time at the shelter and their involvement in the programs changed their connections to the social and institutional network of support around them. My intention in measuring this change was to gain some measure of efficacy of the shelter program that could be correlated with measures of system use.

3.1.1.3 Observation

I used observational data collection, as I did interviewing, throughout my research. The observational work I engaged in derived from two main modes of observation.

First, in the early phase of my empirical work at social service providers I used *complete* observation (Bernard, 2005, p. 347)—that is, I followed the staff at my research sites and compiled notes on their activities, on how they interacted with each other, and on the structure of their organization. During this phase I had limited interaction with the staff, remaining an outsider to the organization and limiting my contact to specific instances of semi-structured interviews.

The second mode of observation I used—*participant* observation—was used during the design and deployment of the Community Resource Messenger. One way to distinguish between complete and participant observation is that “participant observation involves immersing yourself in a culture and learning to remove yourself every day from that immersion so you can intellectualize what you’ve seen and heard, put it into perspective, and write about in convincingly” (Bernard, 2005, p. 344).

The benefit of participant observation is that it provides a great deal of access to the social setting. Within the work I conducted at my deployment site, I was able to build relationships and rapport with staff as well as residents, and as a participant, down play my authority as an outside researcher, and gain trusted access that helped me better situate how the Community Resource Messenger affected the social dynamics at the shelter.

3.1.2 Design Methods

I discuss the design of the Community Resource Messenger in more detail in Chapter 8, however, here I describe my choice of design approaches. There are two main points I would make about my design approach, the first is the role of values in design and my desire to capture and explore how the values at the shelter informed system design. The second point concerns bringing participatory and co-design approaches into a setting whose authority and power dynamics are fundamentally different from

the industrial and production based power dynamics that gave rise to participatory design.

3.1.2.1 Values in Design

Despite concerns with the framing of methods within VSD (Le Dantec et al., 2009), I drew on the framework during early framing of my design investigations. However, instead of starting from a position that relied on pre-defined values, I drew on values that had been expressed during my early fieldwork—such as staying connected, being normal, and having personal accountability.

These values were a way to frame design problems, in particular looking at the tensions that arose between the functional requirements of the care providers—which were often very procedural—and the values of the homeless individuals that were more experiential and socially motivated.

3.1.2.2 Participatory Design

My commitment to developing an understanding of the different values at play within the broader context of urban homelessness guided me toward design methods that were participatory. My design work is most readily divided into two main activities: a design workshop with a diverse cast of care providers from Atlanta, followed by specific participatory design activities with the staff and residents at my primary research site.

The design workshop I held was framed around the idea of “asset mapping” and involved developing a map of the strengths and capabilities of a community—here a community of care providers (Beaulieu, 2002; Hertzman et al., 2002). Asset mapping involves bringing different stakeholders in a community together to develop a catalog, or map, of the resources and capabilities present in a community. The technique stands in contrast to more common approaches that focus on needs assessment and

Table 2: Outline of research phases, sites, and methods used

Research Phase	Site	Interview	Survey	Observation	Design					
		Photo Elicitation Interview	Semi-structured Interview	Unstructured Interview	Family Support Scale	Demographic Survey	Complete Observation	Participant Observation	Asset Mapping	Participatory Design
Phase 1: Initial Empirical Work										
Homeless Individuals	Sites 1 & 2	•				•				
Provider Work Practices	Sites 1 & 2		•				•			
Provider Ecosystem	Sites 1–12		•				•			
Phase 2: System Design										
Design Workshop	Sites 4–11								•	
Participatory Design	Site 10			•			•			•
Phase 3: System Deployment										
Shelter Staff	Site 10		•	•				•		
Shelter Residents	Site 10		•	•	•	•		•		

can work well in settings where external “experts” are often seen as pointing out deficiencies in the community (*e.g.*, Pinkett, 2000).

From the map developed in the design workshop, I was then able to transition to participatory design activities at my primary research site. My approach to the participatory design activities at the shelter drew on recent work in and participatory design research that seeks to better situate the process of design as one that may instantiate and sustain those involved as a kind of public (DiSalvo et al., 2007; DiSalvo, 2009; Ehn, 2008b). The relevance of this perspective to my design endeavors with the staff and residents at at my deployment site is that it focused my work on the ways participatory design, which has traditionally been tied to contexts of production and work, might be placed within a community contexts where power dynamics and stakeholder boundaries form around structures of need and assistance.

Table 3: Research site descriptions and participants

SITE	PARTICIPANTS	DESCRIPTION OF SITE'S PROGRAMS
1	Staff & Clients	Financial and Food Aid
2	Staff & Clients	Employment readiness and rehabilitation counseling
3	Staff	Transitional Housing
4	Staff	Housing search and placement
5	Staff	Civil Legal Assistance
6	Staff	Financial, Food, and Clothing Aid
7	Staff	Healthcare provider
8	Staff	Shelter, Transitional Housing, Rehabilitation Counseling
9	Staff	Financial Aid and Employment Placement
10*	Staff & Clients	Shelter for homeless mothers with children
11	Staff	HMIS Provider
12	Staff	Regulatory Agency

*Primary research site, location of system design and deployment.

3.2 Data Analysis

As the lion-share of my data was qualitative in nature, the greater portion of my analysis involved different techniques to sort, categorize and make sense of that qualitative data. That said, I did engage in some quantitative analysis of data collected from system usage along with measures of statistical significance in the pre- and post-test FSS surveys administered at my deployment site. My aim here is to describe the broad choices I made in how I approached my data analysis, providing a coherent explanation of which modes of analysis were used for the different forms of data I collected: interview data, survey data, and observational data.

3.2.1 Quantitative Data Analysis

My quantitative data analysis included three components. The first centered around the data obtained from system logs and instrumentation, the second on assessing the significance of my pre/post FSS survey data, and the third on measuring correlation between change in pre/post FSS data and the volume of messages sent by participants.

The system use data described when the Community Resource Messenger was used, the volume of messages sent through the system, and the origin and destination of those messages. I go into greater detail about the data in Chapter 9, but will say

here that analysis of the usage data was to corroborate data relayed to me from interviews and participant observation—helping me mix measures of system engagement based on the number of messages sent along with content analysis of what those messages contained and reports from the staff and residents about how those messages fit into their routines and the things they were trying to accomplish at the time.

The second component of my qualitative analysis, measuring the statistical significance of changes in pre/post FSS survey administered to residents at my deployment site, was done by running a Wilcoxon Signed Rank test on the results. I chose this test because, unlike a paired t-test, the Wilcoxon Signed Rank test is non-parametric and does not assume the values are normally distributed (Likert test results should not be assumed to be normally distributed). Moreover, the Wilcoxon Signed Rank test does not require large sample sizes, so the sample size of 16 was well within the capability of the analysis.

To measure the correlation between the FSS survey data and system usage data, I calculated Spearman's ρ which, like the Wilcoxon Signed Rank test, is appropriate for data that is not normally distributed. This correlation provides some evidence for the way the Community Resource Map was integrated into the lives of the residents, particularly those who were able to increase their connections to the different services and support structures introduced to them while at the shelter.

Taken on their own, the quantitative data are an incomplete picture of how the Community Resource Messenger was used. Correlation is not causation, and changes reported in the FSS survey can very well be attributed to causes that have little to do with the presence of a technology intervention. That said, when taken in combination with the qualitative analysis described below, these data and the accompanying analysis help identify trends in use and suggest how those trends translated into changes in the relationships between and among the staff and residents at my primary research site.

3.2.2 Qualitative Data Analysis

While the quantitative data provides clarity on some aspects of my system deployment, my reasons for turning to qualitative methods as the anchor of my analysis are best summarized by Miles & Huberman (1994):

Qualitative analysis, with its close-up look, can identify *mechanisms*, going beyond sheer association. It is unrelentingly *local*, and deals well with the *complex* network of events and processes in a situation. It can sort out the *temporal* dimension, showing clearly what preceded what, either through direct observation or *retrospection*. It is well equipped to cycle back and forth between *variables* and *processes*—showing that ‘stories’ are not capricious, but include underlying variables, and that variables are not disembodied, but have connections over time. (p. 147)

These qualities are precisely what I sought to explore as I delved into understanding and developing technology for the urban homeless: I was focused on very local events, those that revolved around the notion of catalyzing and supporting different publics at the shelter; and I wanted to understand the processional nature of technology adoption as it progressed from design through to daily use.

A discussion of qualitative methods needs to mention Grounded Theory and I will do so only briefly. Grounded Theory is a widely used method for conducting qualitative research developed by Glaser & Strauss (1967) and Strauss & Corbin (1998). The method prescribes a series of steps that build on each other toward the articulation of a coherent theory of interaction and experience within the social context being studied. These steps provide a clear set of instructions about how to proceed through qualitative analysis and historically, helped qualitative researchers legitimize their work to others who were accustomed to quantitative modes of research, particularly those that relied on statistical sampling (Star, 2007; Thomas & James, 2006).

While the procedures articulated by Grounded Theory ensure a robust process of analysis, they are not above critique. One of the central criticisms of the method is that its focus on procedure over interpretation is, in practice, at odds with its Pragmatist origins; that the procedure of Grounded Theory can act as antecedent to

interpretation and impose a specific kind of rationalization on the data (Thomas & James, 2006).

The point I would make here is that Grounded Theory is not the only way to go about rigorous qualitative analysis. As Bernard (2005) points out, qualitative analysis is a cyclical endeavor where “you develop ideas, you test them against your observations: your observations may then modify your ideas, which then need to be tested again, and so on” (p. 453). The rigor comes through the cyclical process, through questioning of assumptions, and through working to refine the interpretation of those observations and to account for different sources of bias.

For my own analysis, I was not aiming for a single unified “theory” of technology use among my participants, rather I was looking to expose different aspects of relevance in different stages of design and use of the Community Resource Messenger. In my approach, I sought to make space for narrative and expression that would not be reduced to fragments of interaction and that did not require a single over-arching framework to explain.

My data analysis did involve iterative coding of interview and observation data, the development of themes from those codes, and the triangulation of those themes with outcomes from my quantitative analysis (Miles & Huberman, 1994, ch. 10). The coding and analysis of my data was normally done by a single researcher—myself—though when appropriate, as in the case of content analysis of messages sent via the Community Resource Messenger, a second coder worked on the data and inter-coder reliability is reported.

The inter-weaving of multiple modes of data collection and qualitative and quantitative analysis of that data is congruous with my human-centered approach to studying technology use in a real-world setting. My findings are not structured as a single theory of use and adoption, but rather as a series of findings that progress from fieldwork to gain insight into current practices and preferences (Chapter 4, 5), reflections

on design process and its role in developing discourse about technology and creating fertile ground for adoption a new technology (Chapter 8), to examining the way the co-designed technology was adopted by different sets of stakeholders and how that adoption effected and mediated relationships between and among staff and residents (Chapter 9).

CHAPTER 4

FIELDWORK: TECHNOLOGY & THE HOMELESS

The goal of the first study was to characterize perceptions of technology among the homeless and to identify the unique needs of the homeless when considering appropriate technological interventions. In this first study, I worked with individuals who were currently homeless, recently homeless and living in transitional housing, as well as those who were on the cusp of becoming homeless due to job loss or prolonged periods of economic hardship.

In this chapter I present the mechanics of the PEI study and the themes that emerged from analyzing the interview data. These themes provide a basis for understanding technology's role within the homeless community. From this early work, issues of technology's legibility begin to emerge, as do issues of legitimacy, particularly around identity and social inclusion and exclusion. At the end of this chapter I will draw out the particular findings that I carried forward into the design of the Community Resource Messenger.

4.1 Study Mechanics

The PEI study was broken into three meetings that took place over a period of three weeks. All direct contact with study participants took place at the first two research sites (see Table 3 on page 47).

Meeting 1: In the first meeting I provided a disposable camera and asked the participants for their preference between the store gift card or Metropolitan Atlanta Rapid Transit Authority (MARTA) card (Atlanta's public transportation system). I explained that they would receive their chosen card at the beginning of the third, and final meeting. By waiting until the final meeting to distribute cards I was hoping to



Figure 2: The camera provided to participants

bolster participant return rates over the three week period. The camera I provided had a modified case which included instructions on camera use, suggestions on what to document with the camera and a reminder of when and where to return the camera. The instructions for what to photograph read:

- Take photos of places or situations where you needed help.
- Take photos of of the things you use: telephones, buses, radios, televisions.
- Take photos of your daily activities.
- There is no such thing as a bad photo. This is your life, your story.

In framing the photo task, I intentionally did not mention the word “technology” in the on-camera instructions. Instead, I briefly discussed different forms of technology with each participant during the first meeting and encouraged a broad understanding

of what might be included under the term technology. To do keep the definition of and experience with technology broad, I told participants an apocryphal story about the impact of a recent move from token-based public transportation to electronic-card-based transportation on the working poor and homeless communities. The point of this story was not to focus ire on a changing public service, but to introduce the many manifestations technology has in daily life. Beyond this brief explanation of technology, I intentionally left the photo task open ended to encourage self-reflection without the imposition of too many rules. Finally, I established that the camera was to be returned to the same site where it was handed out so that I could develop the photos and schedule the final interview.

Meeting 2: After two weeks, I returned to the service provider and collected cameras from the participants. During camera collection, I scheduled interviews for the following week to be held at each respective service provider.

Meeting 3: At the beginning of the final interview, I provided each participant with their preferred gift card and asked them to respond to a basic demographic survey before we discussed the photographs. The decision to not seek any contact information and to delay collecting basic demographic information until the final meeting was done intentionally to provide an extended period for participants to opt-out of the study without feeling regret or distress in having signed up and disclosed their personal information.

Each of the interviews lasted between 45 minutes and an hour and were open ended, constructed around the events depicted in the participant's photos. I began each interview by letting the participant talk about their photos at their own pace. Participants were then asked to specifically talk about technology including the use of mobile phones, computers and the Internet, as well as different forms of transportation they might have used. I also asked all participants to describe their social networks by way of how they stayed in contact with friends and family, how they discovered

different services such as shelters, addiction management, and job placement, and how they managed their daily schedules. I worked to use information in the photos to frame how I posed these questions; in some cases questions were asked in response to content visible in specific photos while in other cases, questions were asked in the absence of photographic context (*e.g.* Why didn't you take a photo of x ?).

4.2 Data Analysis

Each interview was audio recorded and I transcribed those recordings within two weeks of holding the interviews. The transcripts were then iteratively analyzed to generate a set of codes that encompassed topics expressed through the majority of the interviews. These codes provided the basis for the themes presented here.

The topics that motivated my initial foray into understanding the relationship between the homeless and different forms of technology—technology use and perception, social networks, and information management—formed the basis for coding the transcripts. As the analysis progressed, new themes emerged from the data though the focus remained on how technology informed various aspects of the participants' lives. The themes outlined here were those that consistently appeared across participants, except in a few extraordinary cases which are included to illustrate the diversity in the homeless demographic: while homelessness has a relatively finite number of broad-stroke causes, the individual and local experiences around those causes varies greatly.

4.2.1 Overview of the Participants

In total I had 28 participants, 14 from each research site. Out of that total, 13 participants fully completed the study, *i.e.*, 13 final interviews were held. The camera return rate between the two research sites was vastly different: from the first site, only one camera was returned (and a week late and without contact details for us to

follow-up); at the second site, all cameras were returned and interviews held with all but one participant.

As a result of not collecting demographic data prior to the interview, I did not have documented details about the individuals who did not return. Anecdotally, they were more often women and several had expressed that they were currently working or were actively seeking employment. One of the major differences between the first and second site was that the first was focused on preventing homelessness through intervention services (financial aid, utility grants, and food boxes). As I would learn in later fieldwork, this meant that many of the individuals who came to the first site did not return with any frequency, whereas at the second site, the clients were there on a daily basis.

Of the participants I interviewed, 11 were male and two female, all between the age of 46 and 55 years old. Ten of the participants identified as African-American and three as Caucasian. The level of education ranged from the 4th grade (about 9 years of age) to a two- or four-year college degree, with the majority having completed high school or their General Education Development test (GED). The average time spent living on the street was 36 months, with a high at 10 years and a low at six months. At the time of the study none of the participants were living on the street. They all had some form of housing, either through a local shelter or in a dormitory at a transitional housing facility. Despite being currently housed, the photos they took and their responses during the interview were reflective of periods when they were living on the street.

4.3 Findings

There were a number of technology-relevant themes that emerged from the data-driven analysis. This section discusses these themes and sets the foundation of topics I used when engaging with the homeless clients at my primary research site.



Figure 3: Photos from needing to stay connected to family

4.3.1 Staying Connected

The first theme was the importance of staying connected to family members and friends during spells of homelessness. P17 talked about being on the street, *“You stay in that depressing state where you feel as though giving up. You know it wouldn’t be a problem just to give up out there. That’s how you think and stuff so... I have people I talk to on a daily basis, you know, they keep me... motivated and stuff, and make me realize, you know, that it’s going to be okay.”* P27 was more emotional when talking about staying connected, *“It’s one thing being homeless but it’s another thing... disappear[ing] from the face of the earth. And that’s the biggest danger for homeless people. That’s the hardest thing to manage, is when you get disconnected.”*

Many of the participants came from places other than their current urban home and keeping in touch over distance was something they worried about. There was a real concern that something could happen to loved ones and they wouldn’t know it; as P27 put it, *“Somebody can be gone, someone in my life can be gone, my loved one, and they don’t know how to get to me.”* The sense of disconnection from an extended social circle was a considerable source of stress and was remarked on by several of the participants throughout the interviews.

P25 became homeless as a result of hurricane Katrina, a devastating hurricane primarily affecting the Louisiana coast in August 2005. He described the time since

Katrina: *“these last years have really been a really rock bottom, no I mean a really rock bottom. . . You know when you never had no other home address, you know, and you come in somewhere else you gotta move [exchange] your home address for a homeless shelter.”* Prior to Katrina, P25 lived with his mother in New Orleans, Louisiana, and in the course of his family evacuating, were split up; he ended up in Houston, Texas, while his mother ended up in Austin, Texas. He went on to say, *“I haven’t seen my momma since Katrina [2005]. . . When I was in Houston, the Red Cross. . . had a system to put our year, our date and the last address. . . Where ever my mother was at, that’s how they tracked her down. Though when I called her she was on the voice thing. . . I never talked to her I just heard her voice on the thing.”* Displacement, becoming newly homeless, and the affect of losing contact with his immediate family all converged at once.

4.3.2 Synchronous v. Asynchronous Connections

The difficulty P25 had in trying to contact family in the aftermath of Katrina is only one aspect of the relationship our participants had with telephones. Although voice telephony is often conceived of as a synchronous communication technology, this was—in many cases—not a common mode of use for our participants. All of the participants had voicemail accounts through local organizations. These accounts were meant to provide a stable number of contact and aid in job searches and managing appointments or other personal business. The difficulty for a number of participants was in accessing their voicemail, leading to a decidedly asynchronous style of communication when using the telephone.

For access to phones and to check voicemail, participants used free phone services provided by local service providers. P28 noted, *“I have to go to Project Connect [to use the phone], and I don’t go there that much. I go to Grady but you gotta stand around and wait for the phone.”* Many of the participants in this study preferred the



Figure 4: Communication technologies used by the participants

free phones at Grady, the main metropolitan hospital. This service was very valuable to the participants in our study; however, the use of the telephone became part of a larger daily activity of traveling to the hospital, waiting in line and finally using the phone. The challenge is that this routine for phone access required the homeless to go to the hospital, and once there, assumed they had time to wait in line to use the phone. Participants cannot rely on being able to use the phone as they may not go to the hospital or once there, they may not have the time or opportunity to use the phones. This constraint frustrated staying in contact with family members, and imposed uncertainty in time sensitive communications such as job hunting or responding to opportunities for aid.

4.3.3 Mobile Telephony

The preferred way to maintain a stable connection to family and friends for many of the participants in the study was through a mobile phone. P17 talked about the utility of having a mobile phone, *“That [a mobile phone] would have been real useful ’cause there’s nothing like keeping in touch with your family.”* For a number of participants, mobile phones were the only stable connection they had to their pre-homeless lives—eight of the thirteen participants (61.5%) currently had mobile phones. P22 noted that a friend continued to pay her mobile phone bill because, *“that’s the only way [my son] had to get in touch with me.”*



Figure 5: Pawn shop and clothes closet

Long and troubled histories of drug and alcohol addiction had caused some of our participants to sell personal items. However, when I specifically asked them if they would have sold their mobile phone (if they had been able to have access to one), they responded that no, they would not sell the phone for money. P19, who had taken a photo of the pawn shop where he had sold his possessions, specifically noted that he would *not* sell a mobile phone, *“No I would have kept it. That’s one thing, well, one thing of numerous things, that I would have [kept]”* (see Figure 5). This sentiment echoed similar feelings among our participants about the unique value of a mobile telephone.

However, mobile phones were not without problems. The difficulties with mobile phones for the participants in this study were the ongoing cost, the need for access to power to recharge the phones, and the inevitability of theft when living in and out of shelters. P16 responded that he had a mobile phone but, *“[the] mobile phone started costing me more than they were worth.”* Participants desired mobile phones that were on pay-as-you-go, or prepaid, plans instead of fixed monthly contracts; P17 elaborates *“if I got 10 or 15 dollars or something, I put 10 dollar worth of minutes on it [prepaid] so I could use it.”*

For P28, mobile phones were useful and a tool that he would exploit as he had access to them. He talked about using phones he found until the batteries died; *“I had a mobile phone until the battery died... actually I found one in the train after*

that... and I kept using it because the person never did call to see if they could try to find it. It was a Nokia. Eventually that died down and the service ended and I had to throw that away, that was a good phone." Here P28 used the phone to call out but it did not function as a stable point of contact. This opportunistic use of any found or available resource was summed up by P17, *"I mean being on that street, you're taught to, you know everything is valuable to you on the street."*

4.3.4 Identity Management

Homeless persons interact with a number of different social groups and *identity management* was a key aspect of their lives (Goffman, 1959). For participants in our study, different forms of identity management came out through their use of technology and social institutions. Some forms of identity management were used when facing close family or friends while others were employed as defense against the social stigma of being homeless.

Identity management took both technology- and non-technology-focused forms. For example, on the non-technologic side, identity management appeared in how participants managed their physical appearance. P25 talked about mapping out where to go to take showers and do laundry, *"[just] cuz you're homeless, that don't mean you got to look homeless or smell homeless."* Likewise, P26 was very conscious about his appearance and the fact that he had to present himself well: *"I always find me someplace I can take a bath or take a shower or wash up. Because you know I like to keep clean, I'm always facing peoples, I didn't want to stand around in all dirty clothes."*

This desire to not appear homeless presented logistical challenges. Some shelters do not have storage or limit the amount of personal affects a resident may bring in. To address this, outreach centers will offer "clothes closets" where their clients can store personal affects (see Figure 5). P17 talked about managing the logistics of storing

clothes at one location while staying at another: *“If you stayin in the shelter see, what I’m sayin’, you carry those clothes around, you come here [to the clothes closet] every day get a change of clothes you know, to take back with you to the shelter.”*

Technology-centered forms of identity management also appeared prominently in our study. In addition to being desired for staying in touch with extended family, the mobile phone was also a valuable identity management tool for the social value it provided (Snow & Anderson, 1987). P27 was especially sensitive about who of his extended friends he would tell about being homeless. For P27 it was an issue of pride that he was going through a difficult time but, *“they know if I got my mobile phone I must be doing alright.”* So more than providing communication functions, the mobile phone provides a connection to the larger world as a potent social symbol.

P28 used more tools in identity management. He regularly used the Internet at the public library and explained, *“I have a mySpace account. . . I get in contact with friends that have an account with them.”* He was also careful to not tell his mother about the fact he was living on the street: *“I’d just go visit her, I wouldn’t tell her where I was living at.”* Such stable, technology-mediated forms of communication provided an important resource for our participants in managing their own presentation of self, and mitigating the social stigma of homelessness.

4.3.5 Access to Information, Social Networks

The social network was the primary mechanism participants in this study used to navigate the world around them. As noted above, maintaining a social connection with a larger world is critical for individuals dealing with homelessness. These connections are immediately sought out on the street, as much for survival as to get plugged into support infrastructure. P17 was quick to point out that when living on the street, *“you try to get with people you know. You stay around people you know.”* Likewise, P27 pointed out his willingness to help friends on the street, *“I will turn her [a*

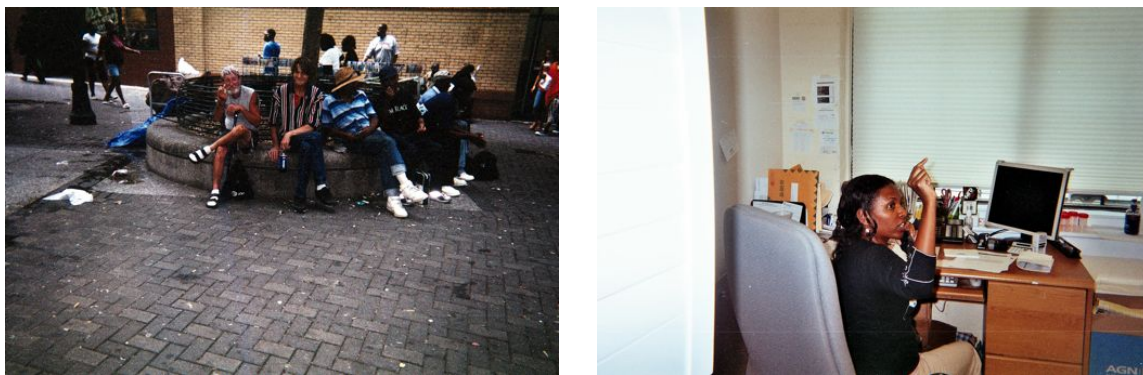


Figure 6: Social networks include street friends and case workers

hypothetical, newly homeless person] on to the good things that I learned. . . I will give this information to other people.” Safety in numbers was a recurring sentiment that illustrates the visceral need homeless people have for finding friends they can trust on the street.

Once they have been accepted into social programs, the focal point for information becomes the caseworker. All but a couple of our participants took a photo of their caseworker or main contact at hospitals or outreach centers. The central role of the caseworker in the lives of our participants is consistent with other descriptions of social networks in homeless populations as being built around the social institutions that provide support (Hersberger, 2003).

The reason the caseworker was the primary contact arises from a combination of factors. First, many social services require a letter of reference to be considered for enrollment. These letters are used to confirm medical conditions, regular participation in addiction treatment, and other eligibility requirements. Second, the capabilities of the participants were extremely varied. Two of the participants were illiterate, while others used computers regularly. Several of the participants, however, suffered from various mental disabilities complicated by a lifetime of homelessness and drug addiction. For many of these individuals, the self direction and discipline needed to seek out services and navigate the system on their own is itself a challenge. They

genuinely need the caseworker to explain the system, setup the appointments, and fill in the forms.

4.3.6 The Digital Divide

Participants varied widely in the use of information technology, effectively resulting in an internal “digital divide” within the homeless community. Three participants, P21, P22 and P28, were regular computer users at the public library. They all used computers to find services, *e.g.*, P21: *“[I look up] services, like if I’m in a crunch say, and there’s certain medication I can’t get through [the hospital]... I go up on the Internet and look [it] up and see if the drug company has any kind of program for it.”* P28 used online services like Monster.com to try to find work and pointed out that for a number of job placement services it is a *de facto* requirement to be on-line in some capacity: *“Some employers, like [a local employment agency focused on the homeless], ask for your email because they send you stuff.”*

These three were the exception in this study. Most of the participants had very little, or no, experience with computers, and their reactions when asked about them ranged from bafflement to disinterest. On the other hand, mobile phones can be complicated devices, but they offer a number of features that were immediately recognized as useful; P20 did not show much interest in computers but said, *“those mobile phones, you’d be amazed... they can wake you up... [help keep] your doctor appointments... They can go off and let you know you got appointment tomorrow.”* The difference in attitude toward mobile phones and computers illustrates an important point of inflection in the adoption of technology within this community. So long as there was a perceived benefit, participants were excited about the prospect of using a new technology.



Figure 7: Local hospital and pharmacy waiting room

4.3.7 Health and Medication

All of the participants interviewed were on medication. Several took photos of hospital or pharmacy waiting rooms and they all made comments about remembering to take their pills and managing doctor and counseling appointments.

The challenges this presented varied for each participant. P17 talked about a picture of his room at a transitional housing facility, *“that’s the back of the door where I keep all my appointments and stuff pasted up so I won’t miss my appointments.”* He had a system so he would see his schedule every time he left his room. P23 had a more proactive reminder, *“I gotta nurse, my caseworker, she calls me to let me know [about upcoming appointments].”*

P25 had a particularly onerous challenge in dealing with his health issues. His formal education stopped in the 4th grade (about age 9) and he was illiterate. P25 was on a number of medications and was forced to be creative in managing how to take them: *“Well, you see by not knowing how to read I go uh, what I do, I know the pills... [and] I got a little sack, a little medicine sack. I have ten bottles of pills so I dump em all out on the bed and... everytime I take one out the bottle, I put the bottle in the sack so I can’t go wrong.”* For P25 to manage his health, he not only needed to devise strategies to work around his illiteracy when taking medications, but

also in managing his appointments and providing reminders to himself about what he needed to do on a given day.

4.3.8 Getting Around

Moving around the city was an imperative for the participants. They often needed to attend addiction counseling to stay in good standing with their shelter's rules, and on-going health problems meant regular visits to the hospital for routine exams and prescription refills.

P26 talked extensively about the difficulty in using the new electronic cards on the buses: *“you know I had conflicts with the bus driver about, well, they say there ain't no money on your card, and I know my card got money on it. And after he drive off another bus come up and it [the card] works... Sometime it won't be your card, it might be the machine. The machine is not working right and they look at us like your card not working or something and you know [if] we get angry, that ain't gonna help us at all, that gonna make the situation bad... I liked it the old way, the [transit] card was ok. You could ride a train or bus no problem, but this year people thinking all the same and get the hang of it because they might tap in [enter the bus or train] but forget to tap out [when leaving]. So you have to tap out too, see, I ride a train so when I tap out that give me a chance to ride the bus. It has transfer on this card.”* Further usability issues noted by our participants centered around the ability to know the value on a card (since there is no way to know how many rides remain prior to attempting to use transportation), the sequence of steps to secure a transfer (as transfers to buses and trains are only valid if the card was “tapped out,” yet it is possible, likely even, to exit the bus without tapping out).

P26's list of complaints echoes the numerous critiques of other technologies (such as those raised by Norman (1988)) that are well-known in the HCI community. Yet it is not just the usability problems in the technology that affect homeless persons;



Figure 8: MARTA kiosks and buses used by participants

the social stigma of being perceived as the homeless person without bus fare is a far more visceral consequence of a poorly designed technology.

4.4 Designing for Inclusion

Many of the themes that emerged from the interviews suggest opportunities for technology interventions: *Staying Connected*, *Synchronous v. Asynchronous Connections*, and *Mobile Telephony* each point to ways communication and social services might be made more available through mobile computing platforms. More than specific design directions, this early work begins to address the questions framing my research: what is the legibility of a given technology? What kinds of literacy does a technology require or afford? And how does its use or presence impart or impede legitimacy as a social actor? The findings from these initial interviews suggest broad areas that I used to shape subsequent fieldwork and my participatory design interventions.

4.4.1 Legible Technologies

The first broad area I address turns on practical consequences of the different legibilities of technology. For the participants in this study, the primary consequence of poorly legible technologies was financial cost—where the costs of communication and costs of travel were a priority. Just as teenagers prefer SMS messaging because

of its predictable cost (Grinter & Eldridge, 2001), participants in this study made communication decisions based on their ability to predict cost.

Pre-paid cellular services allowed the participants to do some planning and cost control. However, the economic model of pre-paid cellular service in the U.S. is problematic for this population. Purchased minutes expire after as little as 30 days and phone numbers that become inactive can be reclaimed by the service providers after 90 days. When the terms of prepaid mobile phones are combined with irregular incomes it puts the homeless at risk of losing their phone number and thus the stable contact point with their larger social network.

In a similar vein, the apocryphal story about public transportation that we used as a catalyst for thinking about technology was not entirely without merit. The local transportation system had recently made a switch from using tokens for ride fare to an electronic-card based system. The cards come in two varieties, a permanent plastic card that costs five dollars, or disposable paper cards that cost fifty cents. The additional cost of the cards is only one factor in the practical consequences. With tokens, it is easy to keep track of how many rides remain. With the electronic cards, in order to know the remaining balance on the card, it must be placed near a reader. This means a user does not know how much credit is left until trying to board public transportation—the card is not legible with respect to remaining fare.

The cumulative effect of these two systems is an inability to plan ahead with budgeting for communication and public transportation. In the case of mobile phone service it affects a homeless person's ability to stay connected to a vital social network and in the case of public transportation it complicates travel planning and creates situations of public embarrassment when attempting to board public transport with a card that has been used up.

While the payment schemes behind these technologies was opaque and hindered planning for the participants in this study, there were positive opportunities to explore

technology's role in this setting. As reported above, the mobile phone was a general form of technology that the participants understood—it was legible to them. In the interviews they would talk about using a phone to manage personal information, to entertain themselves, to take and store photos. At the same time, these activities were not discussed when asked about PCs. The PC remained just out of reach, both intellectually and financially, and as a result, was not a legible technology. The opportunity here centers on the mobile phone where the apparent relevance of the technology meant the participants knew how they would integrate into their lives and identified specific instances of how it would make their lives better. Much in the way the pager was identified in early work (Pinkett, 2000), the mobile phone provided recognizable features to the homeless I interviewed and a clear platform upon which to targeted technology interventions might be explored.

4.4.2 Literacy of the Urban Network

The findings from these interviews have illustrated the importance, and brittle nature, of social networks for our participants; the type of social networks a homeless person maintains has an impact on whether they get off the street (Conley, 1996), and is consistent with the notion of the strength of weak ties (Granovetter, 1973). In trying to strengthen and diversify those weak ties, there is an opportunity to augment the co-located social networks of the homeless population with technology, furthering an agenda of designing for inclusion.

Foth (2006) studied Australian inner-city social networks, describing a set of needs similar to those of the urban homeless, and contrasting between the characteristics of “common purpose, goal, interest, or support need” of on-line communities to the absence of those traits within low-income co-located communities. He pointed out that co-located communities are built around the serendipity of unplanned interactions and not around community members seeking each other out based on shared values. This

dynamic is also true in the homeless context, particularly among homeless individuals living in a shelter or otherwise involved in a program that brings them together with other individuals in similar circumstances: it is the circumstance of homelessness that unites these individuals, but that is often the extent of the similarity where innumerable personal circumstances and diverse backgrounds mean there are not a set of shared values around which to establish a community. This begins to hint at the issue and relevance of publics: on-line communities must seek each other out, and by doing so engaging in a process of articulating a set of common issues that scope membership in a given on-line community. Within the homeless community this same articulation of issues does not happen as explicitly.

That said, the homeless do have common goals such as finding shelter, food, and employment as well as shared needs like addiction management and healthcare. At the same time, the nature of social interactions in the homeless community is marked by an intense preference for the face-to-face interactions. Mixed with the serendipity of word-of-mouth communication that arises out of co-location at shelters and other places of aid, the kinds of literacies the homeless possess tend toward the oral and narrative forms that have are often more present within low-income communities (Beegle, 2003; Ong, 1982) The expressed desire of the homeless in interacting with social workers is to know they have that person's full attention; *e.g.*, phone conversations are not preferred as they do not provide an affordance for measuring attention (Hersberger, 2003). A shared sense of urgency and being treated with dignity are important ways a homeless person identifies a "friend" (Hersberger, 2005).

This literacy of the services available and of the means of navigating them informs what I would refer to as an "urban network," a network that blends social and institutional networks where knowledge is moved through a combination of friends and service providers. Mediating these interactions with technology may not be the best way to preserve dignity and the sense of shared urgency as the types of literacy

needed to be effective at communicating over technology may be different than the kinds of literacy needed to build and maintain an urban network of support (Ong, 1982).

This difference in literacy is in tension with the legibility of the mobile phone and suggests that there is room to explore technology-based support for building and managing an urban network, but that such technology-based solutions need to bear in mind the critical factor personal relationships play in the lives of the homeless. A successful intervention would preserve, or enhance, the personal contact time with case workers and supportive groups as well as enable homeless persons to share experiences and establish new connections. In this way, the potential for augmenting urban networks with technology lies in enriching and multiplying the number of connections the homeless person has to social institutions as well as other members of the community who are attempting to get off the streets.

4.4.3 Legitimacy and Urban Computing

One concrete way to ground tensions of legitimacy is through the nascent HCI research agenda around urban computing. Urban computing has ties to Augé's notion of non-space and the move to embrace a world defined by uniform access to information and pervasive social connections divorced from physical realities (Augé, 1995). Research in urban computing has begun to frame explorations of how wireless technology and the ubiquity of access reconfigure social relationships in urban public spaces. The defining features of these explorations is to engage the classic divisions of public and private space, to understand how people inhabit public spaces, and to consider how technology can create new opportunities for interaction and reflection within those spaces (Paulos & Goodman, 2004; Paulos & Jenkins, 2005).

Urban computing has focused on the question of how the social landscape changes when our preferred mode of communication is via a technological medium. This

change is undoubtedly underway—a glance around the urban environment finds it full of technology mediated communication; however, some efforts in urban computing have not engaged the breadth of social diversity despite encouraging reflection on what it means to be a legitimate member of the urban social space (Paulos & Jenkins, 2005). These attendant issues of legitimacy strike at the stigma of being a member of a marginalized and dispossessed social group, and how those perceptions shape when and how different ICTs are made available, or when and how ICTs render the dispossessed invisible.

Libraries provide PCs that the homeless often use to do everything from manage personal relationships to applying for jobs. Online job applications can be particularly onerous, though—during my fieldwork I helped a participant fill out an on-line application for a job at a local grocery store, the whole process took over two hours with my help and would have taken far longer had the participant been left to do it on his own. Without the ability to save work at public computers, and with strict two-hour time limits, many of the “legitimate” activities a homeless person might hope to accomplish are curtailed and made impossible.

On the flip side, the emphasis on using technology for legitimate purposes impedes the homeless in maintaining their social support networks. Nonprofits may also provide PCs for their clients, but they are often only available under supervision and only for condoned activities—creating a résumé, searching and applying for jobs, seeking other services and information that would progress the individual toward independence. Using these resources for personal email, Facebook, or other social networking sites is often viewed negatively if not outright disallowed even though maintaining social support is one of the primary challenges being faced by the homeless.

Rather than simply challenging personal notions of public and private space, research in urban computing needs to consider the challenges to building out technologies that focus on the range of legitimate ways of living—including being homeless—and supporting a wider experience of what it means to be connected or disconnected to each other. Bassoli et al. (2007) reflected on social computing in this way, enabling a more comprehensive response to what it means to design for the urban environment in a way that included mainstream society as well as marginalized groups like the homeless. Through designing interactions that encourage reflection on the different ways we interact in the physical environment, we can adopt the notion of “non-space” as a basis for creating social awareness of the periphery rather than unintentionally pushing that periphery further out; by recasting some of the technology touch-points of the urban environment as public fixtures, we can create a shared lens through which all participants in that environment can view and respond to each other.

Each of these issues—the legibility of technologies the homeless come in contact with, the literacies of managing their lives on the street and with social service providers, and the interpretations of legitimate use and access to technology—begin to outline how a technology intervention might be shaped for the urban homeless. Mobile phones seem to be a clear platform of technologies in the hands of the urban homeless. As does developing services that extend and amplify social connections rather than rationalizing or automating those interactions. Throughout these opportunities run the tensions of legitimate use and access both to information and services, but also to ways of expression and social membership.

CHAPTER 5

FIELDWORK: CARE PROVIDERS USE OF TECHNOLOGY

After completing fieldwork to better understand how technology fits within the lives of the urban homeless, I then turned to better understand the role technology played for a range of service providers in the Atlanta area. I have divided my study of these service providers into two chapters, the first presented below concerns the in-house work practices at research sites 1 and 2 (also the research sites where I recruited participants for my PEI study), the next chapter discusses results from fieldwork at sites 1–12. My interest in the first two sites was to understand how two very different service providers used technology and how their organizations were configured around that use.

My fieldwork comprised complete observation over six weeks at each research site—totaling 53 hours of observation split evenly across each site—followed by 15 unstructured interviews with key informants from each site. Both sites were gracious in allowing me access to staff, meetings, and most aspects of day-to-day operation. My observations covered times of high activity as well as slower times where only a few people might be present in the building. Privacy constraints meant observations were recorded as hand-written notes. During the hours spent at the two sites, I attempted to observe all parts of the organization. The only interactions I was not allowed to observe were private counseling sessions between client and case manager. Privacy concerns were paramount, but issues of trust were also an important consideration. The director of site 2 explained that it can take a period of weeks to build trust between the case managers and the clients and placing an unknown observer in that context would

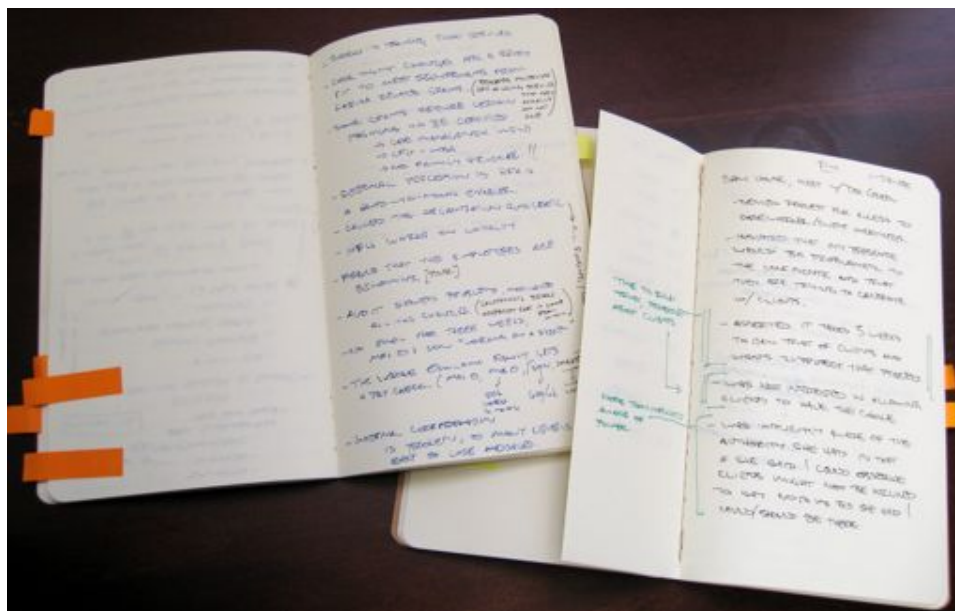


Figure 9: Field notes taken during site visits

be detrimental to the efficacy of counseling. When access was constrained, I followed up with case managers and staff to talk about the kinds of activities they had just completed to gain an understanding of what kinds of work made up their routines.

When working with service providers it is important to keep in mind that the services being provided are often one of urgent necessity to the recipient. In the case of the homeless individuals coming into site 2, they were often recovering from addictions and possibly coming from abusive situations. Even though I was not directly interacting with the clients during this study, there was a risk of my presence disrupting the social balance struck between clients, staff, and volunteers. Being familiar with the relationship of people around you is an important part of feeling in control of life, and generating that sense of control is a significant part of what site 2 provides. As an observer, I had to explain my relationship to the site, and do my best to conduct my observations without disrupting the interactions between staff and clients.

5.1 Contexts of Study

I chose to work with these two particular sites as a way to explore contrasts: site 1 and site 2 not only provide different services to a different set of clients, they also represent a diversity in approaches to organization, coordination, and technology use (a hint of which I gathered during my PEI study). In managing their services, each site had different priorities in what kinds of services were most crucial to the local homeless community and how those services should be distributed.

The staffing levels at each site were comparable: site 1 had eleven full-time staff and a variable volunteer workforce; site 2 had seven full-time staff, four interns, and a variable volunteer workforce. Both sites had budgets of about U.S. \$1 million a year.

Site 1 is best known in the community for its homeless activism and outreach and the grand-scale holiday dinners it hosts at Thanksgiving, Christmas, and Martin Luther King Jr. Day (the organization also has deep ties to the Civil Rights movement in Atlanta). These activities have traditionally targeted the chronically homeless—those who “spend very long periods living on the streets or in substandard housing” (Hersberger, 2005). Since Hurricane Katrina in 2005, site 1 has also provided additional resources to the homeless, working-poor, and displaced in the form of “life assistance” via a food pantry that provides large boxes of non-perishable food, as well as rent and utility grants to individuals who are under threat of eviction or of having their utilities disconnected.

These new services, particularly direct financial aid in the form of rent and utility grants, presented new challenges for the staff at site 1. Where the outreach, holiday dinners, and food pantry were all previously run on private donation, the financial aid programs were funded through local and state government grants and introduced new requirements for accountability and the conduct of case management and counseling with those who receive this kind of aid. These changes were on-going at the time

of my observations and were heavily affected by the existing coordination practices, organizational structures, and adoption of ICTs within the site.

Site 2 worked with different segments of the homeless population through two locations. The first location focused on providing addiction management and counseling for homeless individuals who qualify for disability support (SSI). The second site provided “employment readiness training” for clients who could still work. I spent my observation time at the second location where the focus was on returning individuals to work and included counseling sessions to help match skill sets, a computer lab for creating resumes and conducting job searches, and a number of weekly classes that covered a range of hard and soft skills.

The work practices at site 2 had developed around a sophisticated set of case management practices; the organizational structure, the integration of ICTs, and the development of an independent volunteer workforce had all grown to support the site’s mission of helping homeless individuals get back on their feet through employment and placement in long-term housing programs (*e.g.*, transitional housing programs with on-going case management programs, or subsidized single-occupant housing where clients were more independent).

By looking at two sites that serve differing but overlapping segments of the homeless and poor population, I had hoped to observe elements of the community of care-providers, including cross-organization coordination. While the two sites did not directly refer clients to one another, they both worked with external organizations to generate and receive referrals for individuals in need of aid. The two research sites also represented very different approaches to working with the homeless community. Both were conduits for public welfare programs, and as such, could be described as “street-level bureaucracies” (Lipsky, 1980). Where Lipsky dealt with public servants—those employed by the state—the employees and volunteers at these two sites took on similar roles in administering public policy, albeit as employees of a private organization.

5.2 Findings

In conducting the fieldwork at sites 1 and 2, I found several aspects of their operations were consistent with each other (and likely arose largely from the fact that both were nonprofits focused generally on the problems of homelessness). These consistencies, however, were frequently overshadowed by contrasts that highlight the challenges faced by organizations working with the homeless population. In a number of cases the contrasts between sites 1 and 2 point toward the failings of current ICTs when deployed in the context of nonprofit organizations. But they also highlight the organizational contingencies that arise within the context of nonprofit social service providers: the reliance on a paid and voluntary workforce, the way their workforce is skilled (*i.e.*, trained social workers versus trained system administrators), and the inter- and intra-organization relationships that are implicated throughout much of the work in providing care.

In the remainder of this chapter, I organize my findings from both sites around a set of themes that emerged from the observation and interview data: *Organization, Roles, and Responsibilities*; *Volunteerism*; and *Data Management*. In each of these thematic areas, I discuss the differences between each site, as well as the tensions that arose from their use of ICTs in supporting their work practices. The focus of this analysis is primarily around the work done internally at each site, though in considering issues around Data Management I begin to describe some of the organizational configurations around work done primarily for external stakeholders. In the next chapter I broaden my fieldwork to more thoroughly study the externally-focused work done at social service nonprofits.

5.2.1 Organization, Roles, Responsibilities

The organizational structure within the workplace—work procedures, incentive structures, and the culture of the work-place—defines the contours of how open individuals

will be with sharing information and cooperating toward larger organizational goals (Orlikowski, 1992b). During this fieldwork, I observed two very different internal organizations. The differences between site 1 and 2 impacted everyone from staff to volunteers and affected cooperation and division of labor. What became clear through my fieldwork were the ways in which these two organizations' abilities to appropriate ICTs and develop strong support organization around those ICTs played a role not only in providing service to the homeless community, but also in improving cooperative work practices between staff members, volunteers, and external service providers.

5.2.1.1 Site 1: Growing Pains

Earlier, I noted that site 1 was in the midst of scaling their services up from primarily homeless outreach—providing food, clothing, and ministry to area homeless—to a more involved service and case management structured around homeless prevention. During the duration of my observations, it was clear that the shift in focus had created tensions and distance between staff members trying to understand how to work under the new program.

One of the more significant challenges facing the staff at site 1 was a lack of clarity in job responsibilities. In separate interviews, two different staff described their job responsibilities as being the same and reacted angrily when I commented on the duplication. In observations of working practice in the front office area I frequently witnessed terse exchanges between staff duplicating each other's work and frustrated with the lack of clarity on whose responsibility a particular job was.

Where others have pointed out that apparent duplication of work can be an important part of achieving the overarching goal of the group (*e.g.* the duplication that takes place in air traffic control rooms (Hughes et al., 1992)), the duplication I observed was the result of poor communication from management. This breakdown caused conflicts over work, turf-wars over responsibility, and a heightened level of

anxiety over job security. As a result, cooperation was less likely as staff did not know whom to ask for help. Moreover, the duplication of work and lack of coordination meant that there was a high degree of interruption for staff at site 1. This stands in contrast to findings in other domains where work may also have a high degree of interruption, but is generally coordinated around a well defined goal with well defined job responsibilities (Bentley et al., 1992; Heath & Luff, 1991).

A further breakdown in coordination came between staff in the lobby who were the first to interact with clients, and the case managers who dealt with ongoing care. Often, clients would come in with simple question regarding logistics—double checking an appointment time or looking for an aid check that might be ready for pickup. However, there was no shared repository for basic information such as the case manager’s schedule or other information-only updates the clients were in need of. The lack of coordination between the front lobby and the case managers meant that clients would often have to wait for long periods of time before a case manager was free to answer their question.

This point belies a greater organizational tension at site 1 where stratification between the case managers, staff in the lobby area, and volunteers led to three different worlds of work and clear breakdowns in how work was coordinated among these levels. A significant contributor to the breakdowns between these strata was the absence of any shared artifacts to support organizational knowledge about the day’s activities. In order to share information, staff members relied on face-to-face communication; but unlike email, instant messaging, or other persistent coordination mechanisms, the ephemeral face-to-face interactions I observed frequently led to miscommunication as messages passed through several people (and layers in the organization) before reaching their intended recipient.

5.2.1.2 Site 2: The Hum of a Well Oiled Machine

Where site 1 had a high degree of stratification between the various roles, site 2 was a much flatter organization. Below the director, two program managers oversaw the two major activities at the service provider—the job readiness and life stabilization program and the “clean-street crew” of client-volunteers who worked every morning on different clean-up projects around the city. The clean-street crew was a smaller, self-contained program with no additional staff, while the job readiness programs included four case managers that interacted with clients and with whom the director would coordinate care.

The case managers each had specific duties within the organization: running programs, providing training to clients, and overseeing use of the computer lab. These responsibilities were clearly communicated to each of the case managers as was the manner in which each area of responsibility fit into the larger picture of providing assistance to the homeless individuals enrolled in the program. This clarity, both in the specific job and in the larger framework of social service, created a unity in purpose in the staff and fostered an apparent willingness to share information.

Site 2 also had a rotating contingent of interns from connections with graduate programs at local universities. These interns were involved in case management and were an integral part to the service provider’s activities. Some of the staff had dedicated interns who were assigned to specific areas of the program while the rest of the interns were available as needed to float between case managers. The floating rotation was significant in providing coordinating information between the case managers, in effect bringing the work done by individual case managers into a stream of communication that was constantly circulating around the workplace via interactions with the interns. The face-to-face communication at site 2 was not observed to be problematic in part because it was coupled with a range of technically-mediated forms of coordination (email, shared calendars, and instant messaging (IM)).

5.2.1.3 *Reflections*

While both sites exhibited what Rouncefield et al. (1994) called “constant interruption,” the differences in how those interruptions were managed between site 1 and site 2, and the observed level of stress in the workplace, are in large part connected to the means of coordination present in each site. Site 1 had fairly dramatic breaks between staff with different roles and coordination strategies relied on synchronous communication and the immediate feedback it afforded. As Su & Mark (2008) and Mark et al. (2008) note, synchronous interruptions last longer than asynchronous interruptions and contribute to increased stress—this bears out in my observations at site 1. Moreover, the stress level observed in some interactions at site 1 was likely compounded because no alternatives to face-to-face communication were available.

Site 2 on the other hand used a number of recognizable office technologies to coordinate schedules, share information, and manage time between various staff members. Furthermore, clients at site 2 were encouraged to use similar modes of communication—scheduling appointments with case managers via email, checking a shared calendar at the front desk, and generating and sending documents from the computer lab. The presence of student interns further engendered opportunistic coordination, effectively keeping organizational barriers low and fostering an atmosphere where staff and interns were overtly committed to working together to serve their homeless clientele.

These sites represent a spectrum. Site 2 was organized, and appropriated technology in ways similar to those of for-profit office settings (*e.g.*, Ducheneaut & Bellotti, 2003; Markus, 1994): email, instant messaging, shared calendars, and shared document repositories were all used in support of coordinating case management and providing aid to their homeless clients. The organization at site 2 also matched criteria recognized as fostering innovation, enabling them to more ably adopt new technologies and processes: an organic—or horizontal—organization, clear division of labor, a

degree of specialization, and reasonable technical expertise (Hage, 1999). In contrast, site 1 had a very stratified organization, poor division of labor, and poor technical expertise. All of these factors help explicate why site 1 was having some difficulty transitioning from the outreach and activism activities it was expert in toward case management; their organization structure was being taxed by growth and was poorly equipped to respond to the new demands placed on it.

5.2.2 Volunteerism

Volunteers play a critical role for nonprofit organizations. Volunteers have a variety of backgrounds and expertise and a variety of motivations for volunteering their time. All of these elements have bearing on how volunteers are integrated into an organization, including the use and adoption of ICTs. Additionally, high turnover in the volunteer workforce often means knowledge is not preserved from one group of volunteers to the next, compounding the difficulties of developing a long-term view on the role of ICTs for the organization. One aspect of these tensions is a problem of control over ICTs (Carroll & Farooq, 2007); volunteers typically expect more task autonomy than paid staff (McPhail et al., 1998), and the combination of conflicting motivations and highly constrained resources make it difficult to cultivate the expertise necessary to support sophisticated use of ICTs within these environments.

These issues surfaced at both research sites discussed here. Many day-to-day operations were dependent on the contribution of volunteers, and staff at both sites readily acknowledged that without volunteers there would be no way for the organization to provide the services it did. Yet even as volunteers were depended upon at both sites, the organization and management of the voluntary workforce was vastly different and comprised two very different kinds of volunteers.

5.2.2.1 Site 1: Indentured Volunteerism

Site 1 had considerable physical labor needs. The main office was backed by a large warehouse that contained palettes of donated food, beverages, and clothes. Throughout the mornings on days when the food pantry was open, volunteers would work in the warehouse, moving food, packing boxes to be distributed to clients (each about the size of two cases of wine), and organizing any items that might be arriving from individual or institutional donors. Volunteers were also present in the front office doing a range of cleaning and up-keep chores. Occasionally, office management tasks like restocking forms or answering the phone were completed by volunteers, but the majority of the work involving the business of the site had to be completed by site staff as it involved private information protected by law.

The volunteers that were depended upon for these various physical chores invariably came from a local half-way house, and were in fact only volunteering to satisfy the community-service portion of a criminal sentence. Briefly, in the U.S., half-way houses, sometimes called criminal deferment facilities, are residences where those convicted of lesser crimes serve out sentences that grant a work release. Individuals are permitted to leave during normal business hours to attend work and to serve the community-service portion of their sentence. They must return to the half-way house at night or be found in violation of their parole. While associating this workforce with volunteerism is at odds with the notion of civic do-gooders out to make a productive difference, the staff at site 1 all referred to these workers as “the volunteers.”

Despite being euphemistically called volunteers, this workforce was dealt with in a very authoritarian way—one incompatible with motivating a truly volunteer workforce whose choice to donate time was not mandated by a judicial sentence. As a result, there was an exaggerated imbalance of power between the staff and the volunteers. This imbalance often played out via a changing cast of staff members micro-managing volunteers as they completed menial labor: any staff member could,

and often would, interrupt a volunteer's current task and re-direct them to something else. This inconsistency and lack of coordination between tasks and staff affected the completion of work, but more importantly created a tension between members of paid staff and the volunteers who had to endure constant requests to drop their current job and "come with me."

These features of volunteerism at site 1 stand in stark contrast to other non-profit settings where volunteerism has been characterized as having a high degree of autonomy (Carroll & Farooq, 2007). Certainly, the criminal element represented by the volunteers lead the staff to ensure oversight and strict chaperoning; however, not having a single staff member consistently in charge of the volunteers amplified the difficulties of managing the workforce and ensuring that tasks were carried out to completion.

5.2.2.2 Site 2: A Community of Support

Volunteers at site 2 also played a significant role in day to day operations and labor. In contrast to site 1, the volunteers were often promoted internally from clients who were currently, or had been recently enrolled in the program. After a period of time, typically 30 to 60 days, clients were allowed to volunteer. Clients who elected to be volunteers were giving their time as a matter of choice, and not as a punitive measure. Moreover, due to the fact that many were alumni of the program, there was a sense of giving back to the site after having reached some measure of stability in their own lives.

One way to view the volunteer workforce at site 2 is as another step of apprenticeship (Lave & Wenger, 1991). Once a client had made the role shift from recipient of care to supporting the site as a volunteer, there was an observed progression from volunteering at the periphery of site 2 to more central roles within the volunteer workforce at site 2. This was a central feature that enabled the volunteer workforce

to operate with little direction from staff. Furthermore, the net effect of having volunteers come from a pool of current and former clients meant that not only were the volunteers self-motivated to help, they also already possessed fairly complete knowledge of the work that needed to be done on a daily basis; from putting out breakfast in the early morning to answering phones, directing clients on the whereabouts of case managers, and generally keeping the site open amid the coming-and-going of staff between the two locations that site 2 operated. The more senior volunteers orchestrated the work that needed to be accomplished and interacted with staff when non-routine work needed to be done.

5.2.2.3 Reflections

The differences between the two kinds of volunteers present at the two research sites were dramatic. The authoritarian relationship between staff and volunteers and the choice of coordinating activities was certainly influenced by the fact that staff at site 1 were managing a volunteer workforce of individuals serving criminal sentences. Not only were these individuals watched over carefully, their presence had implications for how the site managed records with private information and where and how it made technology available. However, with no means of enabling self-organization, volunteers had no alternative to being micro-managed by staff. This close management and the extremely high rate of turnover within the volunteer workforce directly impacted the development of expertise in accomplishing much of the manual labor necessary for the day-to-day operations as well as the organizational memory of site 1.

On the other hand, the self-organization of volunteers at site 2 enabled effective organizational memory and a self-sustaining culture of volunteerism within the site. This had effects on the overall relationship of staff and volunteers at the site and the ways in which various methods of coordination were employed. Face-to-face communication was still frequent when coordinating with volunteers, but digital forms of

coordination were also used and even encouraged (*e.g.*, through requests for email correspondence). This came in part because the site provided ready access to ICTs for staff, volunteers, and clients.

5.2.3 Data Management

Data management at the two sites consumed a considerable amount of time each day. From accounting for volunteer hours, to managing client information and tracking services provided, both sites employed multiple, redundant methods for tracking data. A large portion of the redundancy I observed was the result of having to use a state-wide HMIS as mandated by HUD, and one or more *ad hoc* systems for internal client tracking, report generation, and coordination activities.

5.2.3.1 Site 1: Making Do

The data management practices at site 1 were centered around two main activities: accounting for the hours of the volunteer workforce and updating records for the clients receiving services. To keep track of volunteer hours, a log book in the front office was used for volunteers to sign in and sign out. At the end of each day the volunteer coordinator would make sure the books were symmetrical (all those who signed in had signed out) and would note the number of hours next to each name. At week's end, totals were generated and communicated back to the half-way house.

At the time of my observations, the management at site 1 had realized the current method was imprecise and paper-heavy and was in the process of creating an Microsoft Excel spreadsheet to simplify tracking of volunteers (the staff referred to the spreadsheet as a database, a common phenomena in nonprofit settings (Volda et al., 2011)). Yet, while the director of site 1 had a strong desire to move to a computer-based system to track volunteers, the staff continued to use the paper-based system. Their preference for the paper-based system was based on the fact that it was sufficiently ambiguous, enabling negotiation between the staff and the volunteers when

problems or inconsistencies arose in the accounting of hours; *e.g.*, in several instances, a volunteer would have forgotten to sign-in or out and would need to negotiate with the staff in order to get credit for hours worked.

Where the electronic tracking of volunteer hours would simplify some of the work to account and report hours to the half-way house, it was perceived as undermining the social negotiation between volunteers and staff. Given the dynamic of the organization at site 1, the ability for volunteers to negotiate with staff over hours was a rare instance where the authoritarian boundary between staff and volunteer would soften. The staff often gave the benefit of the doubt to the volunteer, providing an opportunity to do the right thing, to act honestly, the tacit agreement being that if the volunteer prevaricated they would not be asked back and would need to find another way of fulfilling the community-service portion of their sentence. This dynamic and constructive relationship with the volunteers was a key social mechanic in keeping the volunteer workforce motivated.

The second set of data management practices, and by far the most important to site 1's activities, occurred in support of managing client records. The most central system in this practice was the state-mandated HMIS. Client information would be entered into the HMIS along with some case management notes, a history of aid received, current address or shelter, as well as information about immediate family and cohabiters. The HMIS offered different levels of protections for some kinds of information; for instance, access to case management notes was restricted on an organization by organization basis (preventing two service providers from sharing case management notes via the HMIS), whereas access to the history of service transactions a client received, including the kind of aid and the amount of any financial aid was visible to other social service providers.

The most consistent reaction to the HMIS was apathy toward the system. There were two points of frustration: first, the connection to the web application was slow.

During peak hours when clients would come to site 1 for the food pantry, case managers only had about 20 minutes per client to enter information into the HMIS and to conduct a short assessment of needs and counseling session. The poor performance of the HMIS meant case managers spent most of their time in data entry and not in interacting with the client in a more productive manner. This was compounded by the need to enter duplicate information in *other* systems, as the mandated HMIS did not seem to generate the reports management needed for purposes of verifying what services they provided to their funders.

The second challenge for case managers at site 1 was that the HMIS did not have better support for sharing information with external organizations. The case managers at site 1 depended on support from external organizations as they constructed financial aid for their clients. Often, a condition of rent and utility assistance grants was that the money provided be enough to completely pay for a service—either a month’s rent, or the entirety of overdue charges with a utility company. A case manager would regularly need to accumulate smaller dollar amounts contributed by several organizations, however there was no central clearinghouse, via the HMIS or otherwise, that helped the case manager identify organizations with available resources. Instead of leveraging the the HMIS that was used state-wide, case managers were left to a kind of calling-tree to manually make contact with organization who could potentially help.

5.2.3.2 Site 2: Computer Supported and Working

The case managers at site 2 were also not pleased with the HMIS, though issues expressed at site 1, like poor responsiveness and the inability to generate appropriate reports were not corroborated at site 2—in fact, the staff member in charge of the at site 2 noted that the system could be customized to the needs of the particular organization. However, just as with site 1, some data at site 2 was duplicated in other system in order to be better used for coordination within the organization.

A common cause for duplicating data management was to more easily facilitate organizing work across several disparate systems. As part of the job readiness services that site 2 provided, clients were enrolled in a voicemail program that provided a phone number and voicemail account. The program was run nationwide and the case manager in charge of administering the voicemail accounts had to duplicate work across three systems: the state HMIS; the national voicemail program; and her own set of documents that she had developed to simplify managing aggregate data on current clients.

Regarding the use of the HMIS at site 2, the most significant issue I observed was the poor affordances it provided for helping case managers coordinate across sites. Despite being built specifically as a software platform to support coordination, the HMIS had what appeared to be arbitrary barriers frustrating that coordination. For example, local service providers were listed in the system as three letter codes that were randomly assigned and had no mnemonic or acronymic resemblance to the organizations they referred to. The upshot was that case managers had to keep additional references—like a list of local sites and the three letter codes taped to their monitors so that they could reference which organizations had been active in a particular client’s care.

A second point to be made site 2’s use of the HMIS was the way case managers used the client history. Where my expectation was that a client’s case history would be used to help the case manager tailor aid in a constructive manner, the case managers more readily described using this information as a way to identify—and curtail—potential abuse of services. For example, if a client’s service history was particularly long, the case manager might deny or limit the client’s access to further services.

5.2.3.3 *Reflections*

Despite the widespread dislike of the HMIS, case managers at both sites had to use it. Both sites relied on the system to reconstruct the context of care for a given client and this context helped indicate if the client was chronically homeless, or if the current situation was new or infrequent. While the ability to construct a broader picture of what a homeless client might be going through was important, the limitations on being able to view case management notes or information about services at other sites meant that the HMIS played only a peripheral role in the effort to coordinate care with external organizations.

Further, while some aspects of the HMIS are analogous to medical records and might be assumed to enable informed longitudinal care, the way it was used at both research sites was more akin to a credit score, indicating potential for abuse and whether an individual was likely to successfully complete the program or attempt to take advantage of the system. Seen in this light, the HMIS provided utility in managing administrative risk for the service providers in this study more than it helped scaffold care for the homeless. This points both to the complex social and political landscape present when working with the homeless population, and demonstrates how ICTs and systems designed to support cooperation can also become tools of enforcement.

More broadly, the HMIS's primary role at both sites could best be described as one of accountability. As both sites acted as conduits for public funds, they were obligated to meet the varied data collection requirements attached to those funds. Different public grants had different, but often overlapping sets of requirements. In provisioning service to their clients, both sites collected data based on the *union* of all sets of these requirements, rather than *selectively* collecting only the data required by the specific grant that supported a particular service.

The consequences of this broad data collection have implications for both the homeless clients and the case managers. There are privacy ramifications for the homeless clients as the personal history recorded in the HMIS is beyond the control of the homeless individual it describes. This creates an additional imbalance of power for the homeless, especially when information about them is incorrect or misrepresented. For the case managers, the practice of adhering to all requirements at all times, rather than just those necessary for a given service, impinged on their discretionary freedom. The constraints on discretion created by the accounting aspects of the HMIS were pointed to in site 1 as leading to a degradation of service. This perception, at least at the case manager level, highlights observations from Lipsky (1980) that “accountability is virtually impossible to achieve among lower-level workers who exercise high degrees of discretion... the results may not simply be ineffective but may also lead to an erosion of service quality” (p. 159).

As for the observed duplication of data present at both sites, the reasons for doing so differed: in one case, duplication was made necessary because the HMIS was incapable of generating the necessary reports; in the other case, opportunistic duplication was employed to simplify frequent tasks of coordination. These differences speak to the relative integration of ICTs across these two organizations, where staff at site 1 had not been able to successfully customize the system and were forced to keep duplicate records to meet external mandates, the staff at site 2 had the support they needed and duplicated work as a matter of opportunistically facilitating internal coordination.

5.3 Opportunities for Design Interventions

Even with the challenges and uneven use of ICTs within the field sites, there appears to be a need for coordination technologies to help nonprofit organizations grow and manage their activities, especially in climates where government support of social services

is on the decline. The challenge here lies in how to bring collaboration technologies developed with for-profit enterprises in mind into environments without professional technical support. Technically sophisticated organizations, such as site 2, were able to adopt a range of ICTs without issue; however, the challenges observed at site 1 point to the difficulty of integrating technologies such as shared calendars or document repositories into organizations with limited technical resources and expertise.

While the work process at the two sites varied considerably, they both had to develop strategies for coping with relatively high turnover and with motivating and working with a large volunteer workforce. One of the strengths of the organization at site 2 was its culture of apprenticeship that spanned client, volunteers, interns, and new staff. The cooperative atmosphere encouraged coordination and developed a high-functioning organizational memory. Yet despite these strengths, developing expertise and stability in certain job roles remained a challenge for site 2—so much so that the current system administrator expressed a wish for a more regimented workflow system to help enforce procedure and policy across generations of staff and volunteers.

This expressed desire is reminiscent of highly-formalized workflow systems like the Coordinator (Flores et al., 1988). While these systems were once the topic of considerable debate (Suchman, 1997; Winograd, 1994), my findings point to ways in which highly rationalized systems are both a barrier to broader ICT use *and* a desired force for normalizing organizational work practices. This split can be viewed in light of ICT’s legibility—negative perceptions of the HMIS often spoiled the experience for the staff and made them reticent to adopt ICTs, *i.e.*, the HMIS colored the legibility of ICTs broadly as being onerous impositions on “real” work. That said, capturing work practice in a formal system could be conceived in a way that fits within existing practices of situated learning that help capture organizational knowledge from one generation of staff and volunteers to the next.

That said, there is clearly a balance that needs to be struck between enabling the capture of an evolving set of best practices and mandating the use of a particular system. In particular, the diversity present in nonprofit organizations means that mandated, one-size-fits-all systems—at least in the form embodied by the HMIS—may be insufficient at best and at worst compromise the discretionary powers of case managers or move those powers into the hands of far-removed systems designers (Bovens & Zourdis, 2002). Where others have pointed to the need for ambiguity in systems that support communication and reflection (Aoki & Woodruff, 2005; Gaver et al., 2003), I would strongly advocate for ambiguity as necessary for systems supporting the nonprofit; both as a way to support volunteer autonomy and control over technology in use, and through information systems that track clients, enabling identity management without subverting an equitable distribution of resources (Goffman, 1959).

CHAPTER 6

FIELDWORK: BOUNDARIES OF ACCOUNTABILITY

In the previous chapter I presented findings from fieldwork focused on understanding the work practices at two homeless service providers. My concern was not just how those research sites organized themselves to provide homeless services, but also how ICTs were put to use in that work. One of the main findings that came out of that fieldwork was the apparent impact of the mandated HMIS on the work practices at each research site. Because the HMIS was used state-wide, it became clear that in order to better understand that particular ICT, I needed to expand my fieldwork to include a broader range of direct service providers.

In broadening the scope of organizations to study, I shifted toward a more interview-driven investigation and sought out homeless care providers that were involved in many different aspects of service provision and who served different segments of the homeless population. I used the same interview guide developed for the initial study at research sites 1 and 2, but also allowed for a more fluid interview to develop around the diverse specifics at each of the additional research sites.

In total, I conducted interviews at 12 different organizations, each providing different, often complimentary services.¹ The interviews took place over the course of a year where I interviewed different individuals at each site: I interviewed case managers and program directors to understand the particulars of direct service at each site; I interviewed executive directors—several of whom sat on the mayor’s regional commission on the homeless and who were actively engaged in fostering more communication between care providers in the greater metropolitan region; I interviewed the executive

¹See Table 3 on page 47

director and head of user training at the HMIS vendor to better understand their role in providing the technology to a staggering diversity of service providers; finally, I interviewed the administrator at the state's Department of Community Affairs (DCA) whose job it was to coordinate HMIS deployment across the hundreds of nonprofits providing human services in the state of Georgia.

My data comprised transcripts from interviews, field notes from my site visits, and documentation covering the HMIS and state and federal requirements for such systems. Analysis was done iteratively and continuously throughout the study. My on-going analysis helped sharpen interview questions and scaffold my investigation of the organizational issues that I encountered.

My main focus was to understand the different kinds of work done at each distinct scale and to allow me to develop insight into how these different scales fit together. In doing so, I broadened my empirical basis for understanding how small and locally focused nonprofits organized and used ICTs; I began to unpack how larger service providers with greater need and capacity for internal coordination put such systems to use; I gained access to agency directors working at city and regional scales and learned how they viewed coordination and collaboration issues; and through the DCA administrator and HMIS vendor, I gained perspective on the HMIS requirements imposed by the state and national scales.

6.1 Scales of Accountability and Influence

As I describe in Chapter 2, the notion of scale I use here turns on the organizational and institutional boundaries of *influence* and *accountability* present within the social service ecosystem. This definition of scale provides a perspective from which to understand the consequences of the hierarchical accountabilities and distinct spheres of influence that exist with the nonprofit homeless services sector.

6.1.1 From Whence HMIS?

Before diving into the details of different kinds of work done at and across the different scales under consideration here, I need to provide an historical aside as to the development of HMIS software in general and the HMIS produce used in the state of Georgia in particular.

Nationally across the U.S., the widespread adoption of HMIS software did not begin until 2003 as part of policy changes initiated by HUD. Up to that point, no systematic reporting was being done, meaning there was no way to reliably measure the efficacy of programs or to enforce accountability for how funds were being distributed at service providers across the country. To address this issue, Congress mandated, via HUD, the collection of service data in electronic form (Sarpard, 2003). In the state of Georgia, a single HMIS has been in use since the HUD mandate went into effect. The use of a single system statewide stands as an exception to the norm—in most states, the selection of an HMIS is made on a locality-by-locality basis, resulting in scores of deployed systems and a very diverse national ecosystem that must all roll data up to HUD.

The HMIS in use in Georgia was developed locally, growing out of an existing case management-oriented system previously in use at a few shelters in the Atlanta area. The genesis of this system came in the mid 1990's, when a handful of nonprofit homeless service organizations joined forces in an effort to reduce duplication, streamline care provision, and support inter-organization collaboration through the use of ICTs. The overarching goal at the time was to ensure effective service and treatment for the chronically homeless. Thus, the HMIS was built to support nonprofits in the urban center who were providing care to a core portion of the homeless population. Based on this expected population, a number of early assumptions were built into the HMIS, including the assumption that individuals and not family units were the primary clientele; data collection was centered around service transactions, rather than

the people who received those service transactions; case management features were optimized for bed and shelter management, rather than services addressing family needs or homeless prevention programs.

After the HUD mandate, this system was repurposed from its role in supporting case management in a few urban service providers, to its new role in satisfying the HUD mandate for tracking service provision statewide. As the statewide roll-out occurred, and as the HMIS was put to new use within new organizations, the ecosystem that the HMIS was used in changed. First and foremost, as the developer of HMIS pointed out to me, the slow and steady uptake of the HMIS that was beginning to happen naturally at the scale of the individual nonprofit transformed into a two year backlash against the system as a result of the HUD mandate. At the root of this backlash was the reaction some nonprofits had to using a system developed to support certain case management philosophies while eschewing others.

The second thing that changed—or that at least became more prominent to the developer of the HMIS after the HUD mandate—was a shift away from the underlying principle of collaboration between organizations to one of regulation and compliance. The view from the director of the HMIS vendor was that while the system was born out of a desire by a few organizations to collaborate, the HUD requirements—while ostensibly sharing the goal of supporting collaboration around service provision—ended up being orthogonal to many of the core assumptions that informed the case management model in the HMIS. This in turn undermined the spirit of collaboration as nonprofits became more guarded while they came to grips with how to maintain regulatory compliance and ensure ongoing HUD funding.

Further, with statewide adoption of the HMIS came a shift in the core use cases the HMIS needed to support. Individuals were no longer the majority client being entered into the system, as statewide use now included a far more diverse set of nonprofits and services. Service transactions were also no longer the most important component to

track, with demographic information becoming far more important. As designed, the HMIS provided reports that were derived from a very specific way of recording service transactions, and it did not produce adequate reporting for family units who received care. Nonprofits, however, were focusing their data entry on the people receiving care and were using a variety of external mechanisms to record service transactions. The result was that records were entered in the HMIS to satisfy HUD requirements but not in a way that enabled the appropriate reports to be generated, painting an inaccurate picture for HUD and frustrating the nonprofits as they tried to understand and reconcile the disparities.²

It is in this larger context that I take up the issue of HMIS use and the implications of work done at different scales: the local scale where direct service takes place, the regional scale where groups of local providers coordinate around specific challenges or geographic areas, and the state and nation scales where overarching policy and funding takes place.

6.1.2 Local Scale: Direct Service Provision

In the previous chapter I described some of the incongruities between how case managers used ICTs and the style of work that the systems in use were meant to support. Two issues stood out: poor technical performance of the HMIS impinged on case managers' productive contact time with clients, and a lack of collaboration tools complicated the task of constructing care across different organizations. In the work I am presenting here, I draw on these initial findings and expanded the investigation of how the HMIS is situated in the larger ecosystem of human services.

The organizations that I interviewed for this work varied considerably. Some were, and remain, very active participants in steering the development of the HMIS. Notably, three of the nonprofits I interviewed considered themselves founding members of the

²This also explains why site 1, as pointed out in § 5.2.3.1 of the previous chapter, resorted to duplicate record keeping to generate reports.

HMIS from its inception in the 1990's. The remaining seven nonprofits had varied relationships with the system. For some it was the sole data management tool in use, while for others the HMIS was used minimally while paper records were preferred for day-to-day operation.

Across all of the nonprofits, the main driving force behind using the HMIS derived from its mandated aspects: the need to record client data to generate reports to funding bodies—typically government based funders at a combination of municipal, regional, state, and national levels. Yet, as noted above, the transformation of the HMIS from a case-management-focused system to one used for HUD compliance meant that the key reports necessary to demonstrate compliance were often difficult to generate because of opaque requirements on how the HMIS needed data entered into the system—the HMIS vendor noted during an interview that for many nonprofits experiencing difficulty generating accurate reports it was not a case of missing data but a case of having incorrectly entered data (*i.e.*, data on individuals and not service transactions, which was problematic for organizations whose services were not available options in the the HMIS). To cope with this difficulty, the case managers would download the data from the HMIS into an Microsoft Excel spreadsheet or local Microsoft Access database to generate reports. This practice, while born out of necessity, raises questions about data integrity and accountability. It also reveals how the report was the priority for the nonprofit, not the data itself, which begins to unpack how different priorities at different scales can result in use of the HMIS that runs counter to expectations held by various stakeholders and certainly counter to the expectations held by the HMIS vendor.

The workflow and data model within the HMIS was built around capturing service information so that it could be usefully shared across nonprofits. For those first nonprofit service providers that were engaged in collaborative care provision, the detailed accounts in a particular client's service history were useful because they exposed the

kinds of services that were effective and provided context for engaging the client on their history of care. The availability of historical data also cut down on the retelling of recent events that may otherwise drive client and case manager interaction as different organizations are pulled into the mix, and it helped case managers identify clients who were, or may have been trying to game the welfare system. As explained by the director of the HMIS vendor, the HMIS set out to address just these problems: ease the burden of moving between service providers so that information only needed to be recorded once, provide a cross-organization history of care so that case managers would not suggest or enroll the client in programs that would work at cross-purposes, and provide a systematic way for nonprofits to coordinate with each other.

With these goals in mind, the HMIS was reasonably well suited to supporting care provision, and in the instances where case managers used the HMIS to support these aspects of their work, it was around the features that they enhanced their understanding of where the client had been, what that person may need next, and which programs seemed to be the most effective. That said, many of the case managers did not use the HMIS to support these activities; instead, they would enter data into the HMIS because they had to, but the “live” data used to inform their case management was kept elsewhere. At the extreme end of this practice were two service providers that had specific staff members or volunteers whose sole job was to manage data entry into the HMIS—the case managers did not touch the system at all, instead relying on paper records for case management support. In these instances, data entry into the HMIS was completely divorced from any interaction case managers had with clients—so case managers did not use the system to inform their interactions, nor did they enter data with an eye toward playing forward to future providers who might turn to it for evidence of what services had or had not been successful.

The collaboration tools the HMIS provided were particularly problematic. Two reasons for the failure of the HMIS’s support of collaborative work emerged through

my interviews. The first was that information about clients was carefully partitioned based on the kind of nonprofit entering the data, the kinds of services being provided, and finally contingent on explicit permission to view shared information from the client. This made it difficult for case managers to access information about a particular client. The second problem, which ultimately led to the collaboration features being dropped from the HMIS, was that in contrast to the careful guarding of information about clients, information about the service providers—such as the availability of the services offered—was viewable by every other service provider with an active account in the HMIS. The result of this global resource sharing model was that when a few service providers starting sharing information about the resources they had—whether financial or program based—they had to cope with a surge in referrals for those limited resources regardless of whether the individuals arriving in their waiting rooms qualified for the aid or not (often, aid in the homeless sector is highly constrained and organizations are typically funded with money that requires it go to veterans, or single mothers, or families, or families with young children). The influx of referrals created more work for the nonprofits attempting to act in a broadly cooperative way while creating negative perceptions of those same organizations as clients were shuffled from waiting room to waiting room.

At the local service provider scale, the motivations for using the HMIS included supporting case managers with accurate information (when such case management practices existed), being able to effectively communicate with other service providers in their cohort, and with being able to meet mandated reporting and compliance standards by funding organizations at the state and federal level. Each of these serve a different scale—the local, the regional, and the state/national. What became apparent was that for the majority of the service providers I interacted with, they had to develop ICT practices that supported compliance in lieu of developing practices that supported regional collaboration or case management.

6.1.3 Regional Scale: Metropolitan Planning & Response

At the regional scale, the use of the HMIS shifted away from working toward more efficient care provision at the single nonprofit. Instead, HMIS use was focused on creating working cohorts of providers to support specific segments of the homeless and extremely poor population. Through my interviews with the executive directors of the service providers, it was revealed that the undertaking to coordinate care was based on both grass roots efforts at a select few of the more active organizations and on support from the mayor's office to make sure different groups were talking to each other.

The facets of the regional scale that stood out were how the HMIS sat viscerally between the needs of direct service providers and the more abstracted needs at the state and national scale. Service providers, as pointed out above, need very specific tools that support them at the "point of sale." On the other side, at the upstream state and national scales, the mandate has been for tools that collect information about the people served and the kinds of services available, leaving the details of how those services are provided to local organizations.

The regional scale, as I found through my interviews, was particularly focused on the need for collaboration across service providers and government agencies. This focus touches on the details of service provision in so far as it identifies which services are complimentary and which service philosophies compatible. It is also driven by data collection as a way to document the collaborations that occur. The motivation for cross-cutting collaboration is partially captured in two multi-year plans created by the city government to expand supportive housing and end homelessness (Commission on Homelessness, 2004; Deloitte Consulting, 2003). Both plans take specific aim at particular needs within the community and set fairly coarse benchmarks for meeting such needs. The mayor's office managed these efforts by establishing different commissions and working groups to address targeted benchmarks. The benchmarks, in

turn drove the requirement that the HMIS provide collaboration support. They also drove a different set of data collection requirements meant to provide accountability about the makeup and mechanics of collaborative efforts taking shape.

This mixture of requirements places the regional scale between the purely data-driven worlds at state and national agencies and the practical day to day needs of those providing basic human services to the city's urban poor and homeless. At a fairly basic level, these requirements can be difficult to reconcile. For the HMIS vendor, there are a host of competing requirements and preferences from the 200-plus service providers who use the system. Their ideas of collaboration differ wildly and their business practices for managing those relationships are not all amenable to the rationalized procedures captured by the HMIS. Perhaps more fundamentally challenging to use and adoption, however, is the focus on providing data to support the collaborative activities.

Despite the claims from proponents of the HMIS that the system was focused on supporting collaboration and community action, the on-the-ground perception of the HMIS by case managers was that it was a tool for meeting mandated data collection requirements from the DCA, HUD, and others. As the regional focus on collaboration has developed, the conversation about how to capture accountabilities in collaborative efforts has begun to focus on what kinds of data need to be kept in order to provide empirical evidence that such alliances are happening and how well they are working. As these new data reporting requirements rolled down to the individual service providers, their perception was that they represented yet another set of onerous data collection activities rather than a set of tools to help service providers identify constructive ways of working together.

6.1.4 State & National Scale: Policy & Outcome Based Metrics

At the state scale, the HMIS is primarily a data aggregator. Our interview with the DCA administrator called attention to the importance of good and accurate data so that accurate funding could be granted for the work being done. In addition to coordinating state funding sources, the DCA also played a role in distributing some HUD funding—with a large grant going directly to the HMIS vendor to continue to evolve the system.³

The need for accurate information about service activities made underreporting a main concern for the DCA. The worry expressed by the administrator was that a significant number of service providers were not using the HMIS to collect service data—or were using it incorrectly—so that reports would not accurately reflect actual service levels. The fear was that if service providers were underreporting, then the state as a whole would not appear to be providing the levels of service it was actually providing. This in turn would put the state’s current funding levels at risk, and create a crisis of already constrained resources.

Where the regional and local scales had increasingly greater need for good HMIS support for direct-service providers, the state scale was much more interested in acquiring good data and less concerned with the details of service provision. Again, this situation is understandable, and not inappropriate, as the role of the DCA is to make decisions about what programs to support, and act as an intermediary to state and national government funding agencies to ensure the necessary services are available to citizens in need.

Despite the state’s focus on acquiring robust data from service providers, the DCA administrator was also aware of how onerous such data requirements could be to

³The vendor was a nonprofit entity who only provided the system for the state of Georgia. The DCA administrator pointed out that many other states use one of a handful of platforms developed by for-profit software companies, but that even in those cases, many of the same challenges and frustrations are present.

nonprofits across the state. Having just returned from a national conference where HUD began to unveil new data collection requirements, the reaction of the administrator was that achieving compliance with what they have now is already difficult enough. Moreover, she noted that the new data collection requirements were focused on providing outcomes-based evidence of program efficacy before the organizational and cooperative support pieces necessary to manage that kind of information at the local scale were in place.

Another complication hinged on a number of decisions made at the outset of the HMIS design to protect the privacy of individuals entered into the system. Again, this goes back to the assumptions built into the the HMIS where it was assumed that it was better for the homeless individuals being serviced if the service providers tracked service transactions rather than individuals. But beyond this local, and activist stance on what data to collect, the HMIS was also partially under the requirements of the Health Insurance Portability and Accountability Act (HIPAA) which dictates the standard of privacy, confidentiality, and accountability around health information. This standard is often applied to information collected in other human service areas that may not strictly be governed by the act, and this was the case with the HMIS. Certainly some of the service providers who use the HMIS need to follow HIPAA rules (those specifically working with HIV and AIDS patients, or with the mentally ill). To complicate matters, according to the DCA administrator, and triangulated from my interviews and observations across the 12 organizations I worked with, a number of additional privacy features were built into the HMIS that do no originate from a coherent set of regulations or published best practices. Some of the issues came up in the previous chapter, and I would call attention to them here as artifacts in the HMIS that arose out of an activist agenda to protect a vulnerable population from the threat of government monitoring but that have the unintended consequence of hindering the kinds

of information sharing necessary to support collaborative action leveraged through the HMIS.

At the state and national scales, the focus on data acquisition blurs the requirements for the HMIS to support care provision activities. Moreover, all of the organizations I worked with, including the HMIS vendor, received significant funding from state and national agencies which in turn aligned their priorities around supporting and participating in data collection via the HMIS. In some ways, this is the classic enterprise dilemma, where the funding and decision making about technology occur divorced from those who actually have to use the technology day-to-day. In the case of the HMIS vendor, the need to develop features that support requirements coming from the DCA is obvious because there is a direct accountability through funding grants. Developing features being requested by the many local providers who use the HMIS is both more difficult because there was rarely consensus on what those features should be, and does not directly impact the vendor because the local providers are compelled to use the system.

6.2 Discussion

My examination of technological and organizational systems that operate at different scales demonstrates how different expectations and uses arise around a shared HMIS. Critically, such scale crossing is becoming ever more important as the public sector continues to embrace ICTs as a way to support local providers' provision of human services and provide data to inform public policy.

6.2.1 Crossing Scales, Boundary Objects, & Classifications

One way forward in thinking about how such large-scale systems cross scales is to consider them as boundary objects (Star & Griesemer, 1989). Indeed, the role of ICTs within the public sector could be distilled down to that of boundary object between

the citizenry, the government, and the public and private institutions that act on the behalf of both.

To a degree, this is how the HMIS I studied was presumed to work: the features directly used by the direct service providers were meant to be structured to support their day-to-day work by maintaining representations of each client—similar to how health records represent patients (Berg & Bowker, 1997). That same information, especially the fields indicating movement between different organizations, was intended to be mutable enough to render an image for organizations that operated at the regional scale of how the population was being served, and by which local providers. Finally, information from across the state would then be aggregated to inform state and national agencies about how policy decisions and directions were impacting specific segments of the population.

Another way to conceptualize the information needs at the different scales—and the role of the HMIS as a boundary object that translated the data between scales—is to turn to a mathematical metaphor. The direct service providers need the data as information directly: it informs them about individuals and about the needs and opportunities that will help those individuals. The regional level needs the first derivative of the data to understand the dynamics of the population within specific geographic areas. The state and national levels, in turn, need the second derivative of the data so that they can understand how quickly change is taking place vis-à-vis public policy decisions and implementation. Throughout each of these transformations, the HMIS should create an ability to represent multiple perspectives on the data and facilitate negotiation and evolution both up and down the different scales (Lutters & Ackerman, 2002).

These features build upon previously established characteristics of effective boundary objects, to wit, “effective boundary objects need to provide practical, political

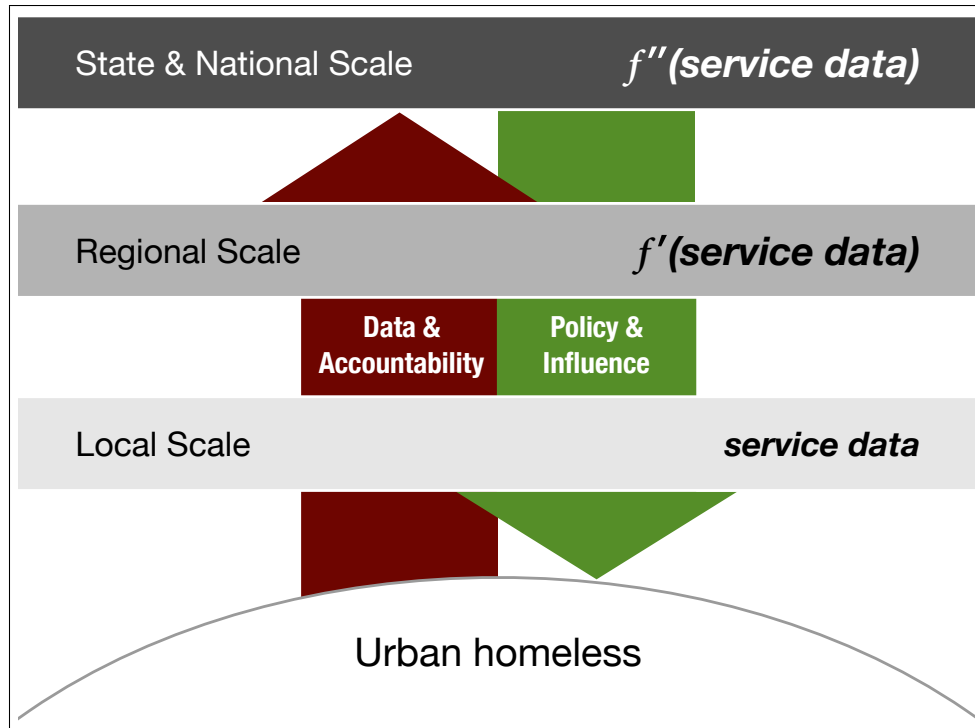


Figure 10: Policy and influence flow downward to ever more local interactions, accountability and data flow upward. Each scale had different needs of the data, analogous to taking derivatives of collected service data at each scale.

means for bridging boundaries,” ultimately working toward creating shared knowledge across those boundaries (Kellogg et al., 2006). However, the cost of doing so is high, even when those boundaries are *within* a single scale. As Carlile (2004) notes, “the cost for any group dealing with increasing novelty at a boundary is not just the *cost of learning* about what is new. It is also the *costs of adjusting* or *transforming* their ‘current’ ways of doing things to accommodate the knowledge developed by another group to collaborate at a boundary” (emphasis his). When the boundaries cross several scales with widely different spheres of influence and accountability, and when there is a dearth of direct means to negotiate the bridging of these boundaries, we end up with the kinds of breakdowns presented here: rather than focusing on how the HMIS could support immediate work needs—like aiding case management, finding available services, or realizing management efficiencies—the case managers at the

direct service providers were chiefly concerned with trying to guess and satisfy the needs of the regional and national scales.

This guessing cuts straight to one of the keys challenges in working across boundaries in that it “is not just that communication is hard, but that to resolve the negative consequences by the individuals from each function they have to be willing to alter their own knowledge, but also be capable of influencing or transforming the knowledge used by the other function” (Carlile, 2002). So for each of the downstream scales (or Carlile’s “functions”), there are negative consequences for not altering knowledge, yet there are few, if any channels for the downstream scales to influence or transform knowledge in the upstream scales.

Ultimately, this leads to misalignment between the expectations at the local scale and the expectations at the regional and national scales. In the context I present here, the difference in expectations across scales and the constricted channels for effecting change upstream undermined the capacity of the HMIS as a boundary object, instead fixing it as a tool for the supervisory scales. As Lutters & Ackerman (2002) note, the interpretation of boundary objects is excluded from the objects themselves, yet in the instances of HMIS use I observed, a significant effort went into preserving one privileged interpretation, foregoing the negotiation of meaning that has been associated with boundary objects used to work in different arrangements (Berg & Bowker, 1997; Lutters & Ackerman, 2002).

6.2.2 Revisiting Riverdale

In approaching the expansion of ICTs within public services, I was struck by the relative stasis within the literature on large scale public systems. In the face of this, it is worth returning to Kling (1978), as many of the finding and trends he identified persist today: use of HMIS does reduce some of the administrative duplication for clients and case managers as individuals move between service providers; however, the

utility of HMIS to case managers is often obscured by their conflicting accountabilities and the uneven use of such systems across the service ecosystem that make integration and efficiency gains difficult to realize and difficult to measure.

Additional dynamics that stand out are the role of data at direct service organizations and at regional institutions. In both my work and in Kling's, issues around how the data should be trusted, and how it could be productively used to secure greater resources are consistent. One of the themes that surfaced throughout Kling (1978) was the on-the-ground truth that the system was an administrative and management aid yet was presented by the proponents of the system as an aid to supporting grass root collaboration. This tension was apparent in the system I studied as well in so far as management at the nonprofits was always concerned with regulatory compliance and satisfying their accountabilities to funders.

While it might be true that the technical capacity at many of the nonprofits was limited, the sanguine view of the capabilities of the system are in direct contrast to the work practices and perceptions of system value-add at the service providers. For many of the organizations I worked with, their interactions with each other and the collaboration they engaged with were sufficiently managed through social channels that had been established over decades of collaboration. For them, the HMIS played purely an accountability role necessary to demonstrate their service provision to external organizations; the HMIS was a tool for conferring legitimacy on the actions of the agencies and their relationship with external organizations (Bechky, 2003).

Again the parallels between the contemporary use of these systems and the use reported by Kling three decades ago are apparent. He noted that, "In contrast to [the automated information system's] marginal utility as an aid for internal management, it has helped some of its agencies increase credibility and gain support from funders" (Kling, 1978). The credibility gap between organizations who embraced the HMIS and those who did not (or could not due to resource and technical constraints) becomes a

new source of tension within the service ecosystem. One of the challenges I observed was that specialized service providers were not well supported by the HMIS in terms of the kinds of information they need to capture to demonstrate their program’s efficacy. This became a disincentive to use the system which in turn disadvantaged them from the preference conferred upon providers who were deeply vested in HMIS use.

6.2.3 Directions for Design

To mitigate the gaps between purported value and actual use, and to provide a broader path to entry and adoption of the HMIS, I might argue that such public systems need to be much more customizable by the local service providers. This might entail a shift from identifying specific collaborative mechanisms which need to be supported toward a system-as-medium approach, as previously argued by Bentley & Dourish (1995). However, this approach is less tractable in a highly regulated environment where the mechanisms of service provision may be set scales apart from where the actual work takes place. Moreover, the ability to customize the system requires a fairly high degree of technical sophistication at the local scale where on-going and unique reconfigurations have the most potential benefit but where such expertise is least likely to be found (Dourish et al., 1999; Le Dantec & Edwards, 2008b).

There are also echos of the tensions that exist within inter-*individual* collaboration in the subtle, contingent nature of inter-*organization* collaboration. Different stakeholders have unique assumptions about what information is necessary, what form it should take, and how it should be integrated into formal and *ad hoc* processes (Ackerman, 2000; Ackerman & McDonald, 2000). One of the challenges that arises out of this tension is the need to balance flexibility to capture dynamic local knowledge at the local scale, and the need for staid and stable categories at the regional and global scale as a normalizing mechanism across a diverse ecosystem.

The constraints on needing technologies that are appropriately configurable for end users and the tensions of representing different kinds of knowledge within the HMIS is a symptom of a larger issue that pervades the cross-scale work done within the nonprofit world: the HMIS is an attempt to merge two very different kinds of work into one system. The first kind of work is the messy and contingent work of the local scale. Building relationships with clients, with other providers, and creating cohesive programs of counseling and services to help individuals out of homelessness needs particular kinds of support. There is an inherent messiness to the work done at the local scale, a messiness that is not easily amenable to the rationalization of process present in the HMIS.

The work done in the HMIS is, as I have laid out here, work done to manage accountabilities. It is partly accounting work with respect to reporting the services provided and the number of individuals who received those services. The use of the HMIS for tracking service transactions is an example that reinforces the inherent costs and dangers of classification systems (Bowker & Star, 1999), and suggests that such costs and dangers are only amplified when the systems in use move across disparate organizational boundaries. But there are other issues that arise from the accounting role of the HMIS: by using the HMIS for HUD consumption, a rigid taxonomy of service transactions was instituted, yet as service practices evolved through use, the understanding of that taxonomy changed. This amplifies distorted interpretations of work at local and global scales—the very difference between the rationalized reporting needed for HUD and the messy work to support operators at the local scale. Eventually the two become disconnected as there is no way within the HMIS to reconcile the disparities between the data and the metadata. I witnessed this effect in part through how case managers abandoned use of the HMIS to capture their categorization of services (*e.g.*, working case notes) and instead only focused on maintaining information in a manner that would support HUD consumption.

Both kinds of work, that to support on-the-ground efforts at local providers and that to manage and report accountabilities, are necessary. The shift here is recognizing them as two different kinds of work and making a clear choice to provide distinct support for each. From the fieldwork I completed, it was clear that work done to support accountabilities was often privileged over work done to accomplish case management, at least with respect to how ICTs figured into the doing of the work. The HMIS was a poor support tool for day-to-day case management, and the organizational and political realities of ensuring “clean” data in the HMIS were a disincentive for using it to support case management. This points to an opportunity to develop technology that supports the day-to-day needs of case management—the communication with clients, the capture of relevant information about on-going care, the coordination between case managers within an organization. This support should be built around the interactions case managers have with their clients and not necessarily assume that those interactions need to be rationalized or normalized around fixed procedures of interaction or established taxonomies of service.

6.3 Wrapping up the Fieldwork

In the last three chapters I have presented findings from the initial fieldwork of my research. These findings highlight some of the broad issues facing both the urban homeless and nonprofit service providers who work with this community. Within this broader set of findings, there are specific details that I would pull out here that tie into the role of legible technologies, modes of literacy, and ideas of legitimate use of technology.

6.3.1 Legible Technology

As I discussed in Chapter 4, my interviews revealed the mobile phone to be a legible technology to the urban homeless with whom I interacted. The mobile phone was legible in three primary ways. First, it was legible as a technology for enabling and

supporting communication—enabling the homeless to keep in touch with family or to establish communication with potential employers. Second, the mobile phone was legible as a computing platform (though the homeless did not refer to it in this manner)—supporting calendaring, the taking and storing of photos, the ability to provide entertainment through games or music, and in some cases, the ability to get online and use the Internet. In this second mode of legibility, it is interesting to note that these capabilities of a mobile phone were discussed as ready to hand in ways similar features on a PCs were not. Third, the mobile phone was legible as a social sign of stability—the participants talked about using a mobile phone, the handset itself, as a way to communicate that they were “okay.”

These different legibilities of the mobile phone provide a number of degrees of freedom in approaching the design of technology for the urban homeless. There is a basis for building out services based on familiar communication channels, be that voice or text. There are also opportunities for turning to the computing capabilities of the mobile phone and seeking ways to use it as a platform for content creation (or knowledge capture). And the social relevance of the mobile phone could be seen as an amplifier with respect to incentives for engaging with the technology—there are social benefits to using a mobile phone and *being seen* using a mobile phone that might help bridge the gap between abstract and distant notions of technology’s long-term relevance and real impact in day-to-day life (Kvasny & Keil, 2006).

For the case workers at nonprofit service providers, the greater portion of ICT use centered around regulation compliance through the use of the HMIS. This informs the legibility of ICTs as supporting a rationalized version of work that goes into providing case management and counseling services to the urban homeless. The upshot in approaching the design of technology to aid the case workers, rather than to improve the cross-scale work done via the HMIS, is that the legibility of the technology needs to be modified so that case workers view the technology as an aid to their work rather than

an additional requirement to generate documentation or produce evidence of service. The skepticism from case workers about the role and efficacy of ICTs in helping them interact with their clients was in evidence during my early participatory design engagements and was something that had to be overcome through the design process, as I will discuss in Chapter 8.

6.3.2 Modes of Literacy

The aspect of literacy for the homeless can be connected to some of the sub-cultural traits of lower income communities and their relationship to oral versus written traditions (Beegle, 2003). There is a fundamental difference between cultural practices that are chirographic (based in writing) and those that are oral (Ong, 1982). Certainly, the urban homeless in the U.S. should not be described as belonging to a wholly oral culture, however, there are similarities in preferences for interaction that derive from orally-based cultures.

In *Orality and Literacy: The Technologizing of the World*, Ong describes nine characteristics of orally-based thought, two of which have particular relevance here: first, oral communication is

“empathetic and participatory rather than objectively distanced. For an oral culture learning or knowing means achieving close, empathetic, communal identification. . . ‘getting with it’. Writing separates the knower from the known and thus sets up conditions for ‘objectivity’, in the sense of personal disengagement or distancing” (Ong, 1982, pp. 45–46).

The preference for face-to-face interaction among the homeless as discussed in Chapter 4 § 4.4.2 aligns with this observation: written interactions undermine the connection the homeless establish, or attempt to establish, with case workers and others upon which they depend. The flexibility of oral communication instills a strong preference for communication that enables the establishing of the empathetic ties.

The second relevant characteristic of orally-based cultures, and one that is closely related to establishing empathy, is that oral communication is situational, rather than

abstract: “Oral cultures tend to use concepts in situational, operational frames of reference that are minimally abstract in the sense they remain close to the living human lifeworld” (Ong, 1982, p. 49). Here again, there are clear connections to the need for person-to-person communication between the homeless and their case workers as it enables the particulars of the situation to come to the fore. The issue of information overload becomes a little more clear with the need for situational thinking because a large part of the challenge is that information is provided to the homeless in written form without the kind of contextualizing necessary to navigate, prioritize, or otherwise make sense of the information and establish an “operational frame” around it. This then leads the homeless back to their case workers as a source for establishing that situation frame of reference.

In preparing the ground for the design of the Community Resource Messenger, the issue of literacy and the way the homeless relate to information and seek to establish themselves with respect to care providers in the community points to two challenges that need to be addressed. The first is recognizing that a technology-mediated interaction between case workers and their homeless clients will likely be textual. In light of this, other degrees of freedom need to be built into the interaction to allow for a more conversant experience so that some of the empathetic and situational qualities of oral communication can be propagated through the textual channel. Relying on the mobile phone is one way to begin to mitigate this issue since there is a constructed social value and social relationship with the mobile phone.

For the case workers, the issue of alternate literacies is one that demands some translation work.⁴ This translation work often involves moving between the rationalized taxonomies of services represented in systems like the HMIS and the messy,

⁴It is worth reiterating here that when I discuss literacy amongst the urban homeless, I am not talking about computer literacy or print literacy, but rather referring to the culturally informed ways of knowing that come along with preferring oral over written modes of communicating. It is not an issue of skill acquisition, but of relating to the world in a particular way independent of how well one might read or write.

local knowledge they and their clients have about the immediate community. This translation work could be done via ICTs, but like much else in the nonprofit social service world, there are practices and preferences for socially constructed ways of accomplishing work so that there is space for ambiguity and interpretation. The lack of these ambiguities is one of the primary reasons the HMIS is not well thought of, and so just as degrees of freedom in use seem to be necessary for the homeless' use of technologies, the same characteristic would appear to hold true for the case workers as well.

6.3.3 Legitimate Use

The issues of legitimacy arose through the fieldwork in the homeless being legitimate users of technology—reactions and assumptions about what kind of technology they might have access to and how they made use of that technology. Aside from the external or popular perception of what technologies a homeless person might have, there were internal perceptions of technology use. These perceptions in greater part arose from the legibility of different forms of technology, the mobile phone being the legible form which was both viewed as a legitimate aid by the homeless as well as a tool for attaining and maintaining social legitimacy by way of what the mobile phone signified.

For the staff at my field sites, there were issues around the legitimacy of different sources or kinds of information. Some of these issues these issues stemmed, as described above, from the mismatches between the taxonomy of services present in the HMIS and the on-the-ground truth of the services being provided. Other notions of legitimacy center around how access to information should be provided, or who controls information. There was often a tension between sharing information freely, with the clients or with other providers, and making sure that those who had access to information had legitimate need to know it or a legitimate ability to act on it. The

dynamics around poor referrals due to overly broad information sharing in the HMIS is one such example where organizations who could not legitimately act on information were creating problems by making inappropriate referrals to their clients.

The larger picture here is that these three issues, of legibility, literacy, and legitimacy are taking place within a particular context and under evolving sets of shared issues. The homeless are dealing with a number of common issues—information overload, maintaining social connections, establishing an urban network of support—but the commonality of these issues is not always apparent. The staff at different shelters are also facing a number of common issues—managing their counseling practices, reporting accountabilities, and maintaining coherent work practices through staff turnover. Then there are the common issues that both the homeless and their care providers work together to address—finding work, housing, maintaining healthcare, and many others. The homeless and their care providers are acting to accomplish specific outcomes with each of these issues and are, I argue, nascent (and loosely constituted) publics. It is the issues highlighted by my empirical work, and the dynamics of legibility, literacy, and legitimacy that inform how these publics articulate the issues facing them, how they organize to take action to address those issues, and how they interaction and reconfigure around each other as some issues require cooperative action (are defined by the need for cooperative action) that crosses the social boundaries of client and care provider. In the next chapter I will introduce publics as a framing concept and set the foundation for how this notion of publics informed the participatory design of the Community Resource Messenger and supports my analysis of its deployment.

CHAPTER 7

THEORY: DEWEYAN PUBLICS

In this chapter I will introduce Dewey’s notion of a public and trace recent work in HCI, PD, and STS that has brought the framing of publics to bear on the design of technology in community contexts. Throughout each of these areas of inquiry there is a shared thread of exploring and engaging different discourses around technology and innovation. Broadly, this can be viewed as an effort to democratize innovation; to develop a design practice built around the reality that “innovation today is rather heterogenous, partly open and public, [and] engag[es] users and other stakeholders across organizational and community borders” (Björgvinsson et al., 2010).

Participatory design is, in many ways, a natural fit for this kind of design work. Its tradition of engaging power structures and seeking the “empowerment of resources to weak and marginalized groups” (Björgvinsson et al., 2010) creates some natural affinities between PD and the development of ICTs in community contexts. The notion of publics, and the attendant concepts of “attachments to issues” (Marres, 2007) and “infrastructuring” (Latour, 2004; Ehn, 2008b; Björgvinsson et al., 2010), provide scaffolding for framing PD in contexts where innovation needs to, and does, happen across organizational and social boundaries. These concepts frame diverse engagement in discourses about technology and their design, account for tensions and antagonism within community settings (among actors and technologies), and provide insight into the mechanisms that transform groups of stakeholders engaged in product design into a public, engaged in an ongoing process of identifying and addressing social issues.

7.1 Deweyan Publics, Attachments, & Infrastructuring

In Chapter 6, I described the work done at social service nonprofits as crossing scales. Publics grant a perspective for understanding how individuals from these different scales—and different stakeholder groups—come together around a unifying set of issues. This focus on issues, and on the action taken to reach a desired outcome with respect to those issues, is an important element of why publics are a potent frame for PD in community contexts: it helps shift the focus from the entrenched power structures coincident with established stakeholders, and instead seeks to highlight how diverse actors, including those with potentially oppositional positions, come together to address a set of shared issues. In short, the issues become the frame, not the actors involved.

The notion of publics is germane to HCI and the design of interactive technologies in so far as it provides space for conceptualizing multiparty engagement with technology by identifying and relating shared issues and promoting or supporting different forms of action (DiSalvo et al., 2007; DiSalvo, 2009). The argument is that ICTs enable people to express issues, both issues already understood as well as issues that emerge through engagement and reflection with an interactive technology. As these issues come into focus, people can begin to organize and take action with respect to those issues, and that action may again be mediated or supported by the deployment of ICTs. The notion of publics highlight the socio-technical interplay between ICTs, the expression and construction of common issues, and the action taken to mitigate those issues.

7.1.1 Dewey’s Public

The vernacular use of “the public” is normally meant generically—referring to “the general public.” But publics are far from generic or general, they are, according to

Dewey (1954 [1927]), particular. Publics are organizations of individuals that come together around and through issues:

The public consists of all those who are affected by the indirect consequences of transactions, to such an extent that it is deemed necessary to have those consequences systematically cared for. (pp. 15–16)

...

Those indirectly and seriously affected for good or for evil form a group distinctive enough to require recognition and a name. The name selected is The Public. (Dewey, 1954 [1927], p. 35)

One noteworthy aspect of Dewey’s conception of the public, then, is that publics are not *a priori* social groups. Rather, a public is a unique federation of people who are together influenced or impressed upon by a specific set of conditions. As a public, they seek to address those conditions and their consequences. It is the combination of a set of shared conditions—issues—and action taken to reach desired outcomes with respect to those issues that form a public.

Dewey’s notion of plural publics, delineated by issues and formed through action, came as a response to Lippmann (1993 [1927]), *The Phantom Public*, where Lippmann presents a view of political action as bifurcated between insiders (agents) and outsiders (bystanders): insiders have the position and knowledge to effect action, outsiders do not and should not impede the activity of insiders. Lippmann’s disillusionment with participatory democracy stands in contrast to Dewey’s optimism—where one sees the public as ineffectual meddling with experts, the other advocates for more participation in civic action.

Despite these divergent views of how the public should participate in democracy, Dewey and Lippmann agree that a public is not a vehicle for the expression of popular will, but is an assemblage of individuals that coalesce around a shared set of social issues: “publics form when issues require their involvement, and these publics are dedicated to ensuring that such issues are dealt with” (Marres, 2007, p. 770); however,

while shared issues bound a public, it is not until organized action takes place that a public takes form.

While Dewey and Lippmann were concerned with publics as they related to statehood, it is useful to consider the formation of publics at scales that may only include particular communities (these communities may be physical—such as neighborhoods (DiSalvo & Lukens, 2009)—or they may form around virtual and distant interactions (DiSalvo et al., 2007)). Within this smaller, more intimate scale, we still have the general principles that groups of people need to identify and express shared issues and then organize and take action to achieve a desired result with respect to those issues. Deweyan publics provide a way to understand the procedures around which a public forms, specifically focusing on relationships to issues and the subsequent action taken in response to those issues.

Technology's role in fomenting a public occurs at the intersection of expressing issues and supporting action. Both in Dewey's pragmatist view of participatory democracy, and in the early movements that gave rise to the social phenomena around the Internet, we find a deep optimism about society's ability to overcome challenges through sharing ideas (*i.e.*, identifying issues) and engaging with each other (*i.e.*, mobilizing action) (Dewey, 1954 [1927]; Turner, 2006).

However, sharing information and organizing a group to action is not easy—even with the benefit of widespread use of ICTs, creating an identity for a public is a challenge:

Indirect, extensive, enduring and serious consequences of conjoint and interacting behavior call a public into existence [by] having a common interest in controlling these consequences. But the machine age has so enormously expanded, multiplied, intensified, and complicated the scope of the indirect consequences, [and] formed such immense and consolidated unions in action, on an impersonal rather than a community basis, that the resultant public cannot identify and distinguish itself. (Dewey, 1954 [1927], p. 126)

The point being, while publics can form around collective action, the myriad consequences facing contemporary society “produce both disaffection... and skepticism that collective action [can] solve pressing social problems” (Asen, 2003, p. 178). This comes in part, as Dewey observes, because

many consequences are felt rather than perceived; they are suffered, but they cannot be said to be known, for they are not, by those who experience them, referred to their origins. (Dewey, 1954 [1927], p. 131)

Herein lies the balance to be struck when deploying ICTs in support of public: as the ability to identify and express issues is made more accessible, support for connecting those affected by an issue to means of taking action to address the origin of that issue must also exist. As we develop and deploy ICTs in community contexts, we have an opportunity to provide tools that both amplify the ability to identify and articulate issues and propagate the context of the origin of the issue to empower action.

Sackman makes this very point when he suggests that real-time computing could be the tipping point for supporting and instigating public action (Sackman, 1968). Developed in light of command and control systems of the mid-1960’s, Sackman’s assertion is still compelling—and optimistic—when applied today: constituting and supporting publics can be accomplished with technologies that enable access to information, provide means of distributed information production, and that include social mechanisms to identify and sustain individual members will help small groups mobilize and organize around the issues that affect them. It is this idea that has brought publics to the fore as interest in social movements and political action has grown in contemporary design (*e.g.*, DiSalvo et al., 2010; Hirsch et al., 2010; Lievrouw, 2006; Light et al., 2009; Saeed et al., 2009). The relevance of Dewey’s perspective draws precisely on its tie to issues. It is the dynamic and contingent nature of a public, its fluid qualities as an entity that forms and un-forms in concert with the evolving social conditions, and the manner in which diverse individuals are enlisted to contend with

the affects of particular issues that make a public a useful perspective for design and frame for grappling with the role of ICTs in a community context.

7.1.2 Attachments to Issues

As Marres (2007) points out, “Lippmann and Dewey...moved away from the modernist idea that public involvement in politics is dedicated to expressing popular will. They proposed a shift in the purpose of public involvement from will formation to issue formation” (p. 769). This focus on issues is a critical piece in the relevance of publics to PD. In particular, it is the articulation of issues, and the embrace of conflict and contention that accompany the formation of a public that differentiate the publics as a framing device from other concepts like stakeholders.

Constituting a public is first an expression of issues, but this expression has a particular perspective and is informed by the makeup of the public and its relationship to the larger world. As a public mobilizes to address a set of issues, it implicates a set of relations in the world, some of which involve individuals, resources in a community, and objects (*e.g.*, recent work in STS has taken up the question of how objects figure into the formation and expression of publics and their issues, and how design processes and products might implicitly or explicitly participate in this endeavor (Dryzek, 2009; Hildebrandt & Gutwirth, 2008; Wilkie & Michael, 2009; Ward & Wilkie, 2008)).

These relationships can be described as “attachments” which fold in the interplay of “dependency on” and “commitment to” that occurs as publics form and enlist the resources of its multifarious members (Marres, 2007). This view of attachments is meant as a distinction from the notion of “frames”:

The notion of frames stands out as an empirically useful concept to describe how public concern about issues is regulated by substantive means; that is, through issue definitions. According to one influential definition, the notion of ‘frames’ refers to ‘ideas’ and ‘values’ that help to ‘select some aspects of a perceived reality and make them more salient in a communicating context’ [Entman, 1993: 53]. Frames are credited with the ability to organize public engagement with issues, insofar as they ‘provide people

with the considerations they use when they respond to the issue' [Entman, 1993: 55]. (p. 772)

...

Frames are usually characterized as relatively stable entities—established ideas, values, symbols or institutional devices—that are relied upon to set limits for unstable things. However, a distinctive feature of associations that are highlighted in public issue definitions is that they can no longer be taken for granted... (Marres, 2007, p. 774)

In relation to PD, increasing or supporting participation, on its own, is an act of framing where the inclusion of different voices changes the frame. Framing, however, is divorced from issues themselves (it is a view upon existing issues) and frames are taken for granted (as pre-existing points of view). So frames do not expose the tensions present in the dependencies and commitments of a public because those dependencies and commitments are marshaled and modified by the constitution of the public—that is to say a public, according to Dewey and as taken up by Marres, exists externally to existing institutions and so cannot be adequately represented solely by the perspective of those existing institutions (*i.e.*, frames). Attachments, however, do provide a means of understanding the conflicts inherent in the constitution of publics by recognizing the interplay and emergence of dependencies and commitments that form as the public forms:

by approaching issues as particular entanglements of actors' attachments, it becomes possible to credit these entanglements as sources and resources for enacting of public involvement in controversy. (Marres, 2007, p. 775)

The notion of attachments, then, foregrounds the dynamic relationships formed around issues and connects to the ongoing discourse around the role of PD as a means for engaging with power structures and marginalization (Balka, 2006; Beck, 2002; Shapiro, 2005). The important point to note here is that constituting publics, and the development of attachments, seem to be just the kind of politically engaged position advocated within PD: constituting publics, and the role of attachments are a way to directly connect with issues and reinvigorate a politically engaged PD in order

to contend with the fact that “forms of participation exist and presently thrive that do not question, but further, dominant power patterns” (Beck, 2002, p. 82). Where frames can be argued to reinforce these entrenched power structures, the pragmatist notion of attachments and publics enables us to move beyond a response to known relations in existing authoritative structures, toward a means of understanding and expressing dynamic power structures.

7.1.3 Infrastructuring as Design

Deweyan publics, and the notion of attachments, provide conceptual scaffolding for understanding forms of civic action that center around marshaling diverse resources to confront particular issues. To accomplish this, however, there is additional work that takes place in the interplay between the social structures that form and the ICTs that act as enabler or amplifier.

In Ehn (2008b) and Björgvinsson et al. (2010), we begin to see a turn in how PD is framed within a broader community context. Rather than approaching PD as an orientation to product design focused on responding to present conditions, Ehn develops the argument that PD is more appropriately understood as future design in what he terms (borrowing from Star & Ruhleder, 1996; Star & Bowker, 2002), “infrastructuring”:

Hence, there will be a shift in focus from design-games aiming at useful products and services, to design-games to create good environments for design-games at use time. Typically this will at project time lead to an occupation with identifying, designing and supporting social, technical and spatial infrastructures that are configurable and potentially supportive of future design-games in everyday use. (Ehn, 2008b, p. 96)

The idea of infrastructuring through design turns on the distinction between a PD considered primarily with design-for-use, centered around useful systems, and a PD focused on design-for-future-use, structured to create fertile ground to sustain a community of participants. This entails a shift from treating designed systems as fixed

product, to treating them as ongoing infrastructure; the processes that relate different contexts (Star & Ruhleder, 1996). Infrastructuring, then, is the act of creating socio-technical resources that enable adoption and appropriation beyond the initial scope of the design and which may include participants not initially present during the initial design:

Infrastructuring can be seen as an ongoing process and should not be seen as being delimited to a design project phase in the development of a free-standing system. Infrastructuring entangles and intertwines potentially controversial “a priori infrastructure activities” (like selection, design, development, deployment, and enactment), with “everyday design activities in actual use” (like mediation, interpretation and articulation), as well as “design in use” (like adaptation, appropriation, tailoring, re-design and maintenance)[Karasti and Baker 2008, Twidale and Floyd 2008, Pipek and Wulf 2009]. (Björgvinsson et al., 2010, p. 43)

Part of the distinction between PD for useful systems and PD as infrastructuring comes by broadening the view of what counts as innovation, of moving away from a technocratic view of innovation toward one that includes social innovation—which is to say, innovation that arises out of social interactions and action—*i.e.*, that arises from the constitution of a public (Björgvinsson et al., 2010). Another component is perhaps best expressed as the difference between federating individuals in the discovery of unknown issues (in the case of infrastructuring), rather than as a multi-stakeholder response to known issues (in the case of PD for useful systems). This position calls back to the frames/attachments dichotomy from above. Frames are largely about working around known issues, attachments about responding to evolving commitments and dependencies.

The distinction between PD for useful systems and PD as infrastructuring is not to say that the two are mutually exclusive: participation in design is necessary, but not sufficient for infrastructuring: infrastructuring can, and does, occur around systems that were intended to be useful (I would argue the development of the the Community Resource Messenger is such an example). The larger point is that infrastructuring

can be viewed as one of the key components to sustaining a public over time. Where attachments to issues delineate the public and create resources for action, infrastructuring enables a public's members to identify and address issues in an ongoing manner, creating a socio-technical response that relates between the current context of the public and the future context the public is trying to attain.

7.2 Deweyan Publics & Design

The relevance of the Deweyan public to design can be encountered most directly in Latour & Weibel (2005) where they describe a curated collection of projects whose commonality came from an attempt to articulate contemporary socio-political conditions and provide means for collective expression of and response to those conditions (see also DiSalvo et al., 2007). This effort is one example of an inquiry into the relations between design and Deweyan publics and evokes the notion of an object-oriented democracy, or a democracy in which objects and things are acknowledged as playing a vital role, particularly in the constitution and expression of publics (Latour & Weibel, 2005). Latour's explicit interest in exploring political actions, and the notion of Deweyan publics, is important for PD because it provides a perspective from which to engage with the attachments to issues that shape how a diverse set of actors might take up action. It is not just participation in design, but a particular orientation that looks to issues rather than stakeholders as the inertia behind PD.

To illustrate the point, the literature on public participation has many examples of ICTs designed to engage diverse stakeholders in process. For example, projects like UrbanSim or Water Wars have used participation mediated by technology to bring different voices into discourse over shared policy and development decisions (Borning et al., 2005; Friedman et al., 2008; Hirsch, 2010). These efforts have certainly been effective and raised important questions within the research discourse of how to build large-scale participatory systems. However, these projects are largely about

framing issues through the lens of established stakeholders—perspectives within each of the respective communities with long-held positions on the costs and benefits of development or use of water resources.

These examples use participation to frame the issues—stakeholders engage in a discourse around known points of view. Certainly, this is an important endeavor, but it is not the same as constituting a public. Constituting a public requires participation, but it also requires infrastructuring—articulating the attachments to issues participants have and then integrating those attachments as socio-technical resources for taking up action. It is through infrastructuring that resources are developed that allow publics to form and act in response to the inevitable issues that arise from interaction and experience with socio-technical resources. Moreover, the ability of publics to form in anticipation of consequences provides opportunities for situating PD in ever-more political conditions where individuals and groups form as publics to take action in support of their desired futures.

Indeed, a move toward approaching PD as one of constituting publics, rather than products, is consistent with a reformist or activist agenda of broadening the impact of PD (Shapiro, 2005). The act of infrastructuring is the core to supporting such an agenda as it moves past participation as a framing for design toward participation as an on-going act of articulating and responding to dynamic attachments; the public, however it might be constituted, is a socio-technical response to these dynamics.

With respect to the research I am presenting here, it is within the ambit of publics that the issues of legibility, literacy, and legitimacy played out at my primary research site. In the following chapters I will discuss in more detail the formation of two publics that occurred through the design and deployment of the Community Resource Messenger. Within this setting, legibility, literacy, and legitimacy describe the socio-technical dynamics as the publics formed, articulated issues, and took separate and joint action to mitigate the issues facing them: the legibility of the design process

and then of the resultant technology informed how the staff and residents began to identify and bound themselves as publics; the literacy of the staff and residents with respect to how they interpreted the Community Resource Messenger and their collective ownership of it impacted how they used the system; and as shelter routines shifted around the use of the Community Resource Messenger, staff and residents renegotiated their relationships as attachments to issues shifted or became visible in new ways.

CHAPTER 8

SYSTEM DESIGN

The design of the Community Resource Messenger took place over the course of about nine months—beginning in the early spring and wrapping up in the late fall of 2009. The design process was participatory and involved three main design encounters: the first was a day-long workshop with eight of the service providers I had worked with during my initial fieldwork (sites 4–11, see site descriptions in Table 3); the second design encounter involved a series of participatory design sessions with the staff at my primary research site (site 10); the third design encounter mirrored the second and consisted of a series of participatory design sessions with the residents at my primary research site.

Throughout the design work, I placed considerable effort in developing a discourse about technology design with the staff and residents at my research sites. The primary challenge in developing this discourse was creating an environment where my ideas, as a researcher and interaction designer, were not taken at face value; I had to work to create a setting where the staff and residents could challenge the things I said and feel empowered to provide direction and details for the kinds of features and interactions they wanted to experience with the technologies we were discussing. This was a particular challenge with the residents at my primary research site because they were at the shelter for only a brief period of time and had, in many ways, become conditioned to accepting the advice and direction of authority figures.

In the sections that follow, I discuss the structure of the design workshop and how those materials led into the more focused participatory design sessions with the staff and residents at my primary research site. I approached the participatory design under

the rubric of design for publics, as set out in the previous chapter, and I illustrate how this design orientation guided my interactions with the staff and residents and led to a design of the Community Resource Messenger that supported these independent and interconnected publics.

8.1 Design Workshop: Mapping Service Provision

The workshop was an all-day event structured around three “mapping” activities which culminated in a final session to integrate the materials developed during the day. Together with the workshop participants, we documented the range of resources available through their organizations and identified the appropriate audience for receiving those resources; we mapped the flow of information through each provider, including information about clients, information shared between service providers, and information necessary for external entities such as HUD or the DCA; we documented the goals that clients were to meet while under the care of the provider, and the flow and structure of care provision. The materials from each of the three activities were then synthesized together to provide a comprehensive “map” of each provider’s activities and a way to relate individual provider maps to each other. The day’s activities juxtaposed resources, process, and goals against the geography the service providers covered, their different philosophies of providing service, and the procession from crisis to stability for their client. The materials generated during the design workshop became a tool to engage the participants around specific challenges and opportunities for technology intervention.

The eight service providers involved in the workshop covered a range of services available to the homeless or nearly homeless. Two of the service providers were best described as homeless prevention service providers as they provided financial services meant to intervene with individuals and families facing eviction or the disconnection of basic utilities. Two separate service providers ran shelter and transitional housing



Figure 11: Design workshop with a diverse cast of homeless service providers

programs, one for the full spectrum of homeless individuals, the other for families. The remaining service providers had programs ranging from securing long-term housing, healthcare for women and young families, and civil legal assistance. The last agency involved was the system provider for the the state-wide HMIS system, Pathways.

8.1.1 Mapping Resources

The resources exercise was built around resource cards that were provided to the participants. Each card included space for participants to name the resource (*e.g.*, résumé writing workshop), the audience (*e.g.*, families with children), a description of the resource, the frequency and duration the resource was available (*e.g.*, some financial aid resources are one-time interactions, while counseling-based resources are defined by a series of interactions), the name of the provider, and finally any requirements that needed to be met in order to qualify for the resource (see Appendix A § A.3.2 for copies of all materials used in the workshop).

The exercise was set up to encourage participants to think of their services in the smallest discrete forms possible to help expose areas of commonality and overlap in the kinds of resources available. Each of the resource cards represented locations of interest within the larger conceptual framework of a resource map—*i.e.*, locations and constraints for securing various resources. The geographic locations were defined by



Figure 12: Resources and Goals generated by workshop participants

the location of each service provider, however, some resources were available at more than one location, from more than one agency. In these cases, the constraints on the resource (target audience, or constraints on who qualified for the service—families, women, veterans) each created different kinds of boundaries on the conceptual map.

8.1.2 Mapping Information

The second exercise focused on the flows of information that pass through the participating service providers. The participants were asked to draw the different sources and types of information that passed through their organizations on a large sheet of paper (see Figure 13). Examples included the information necessary for client intake, for client referral (both outgoing and incoming), and information for external accountabilities to HUD, DCA, and other grant providers. Some of the information connections were explicitly about providing information to support care provision, while

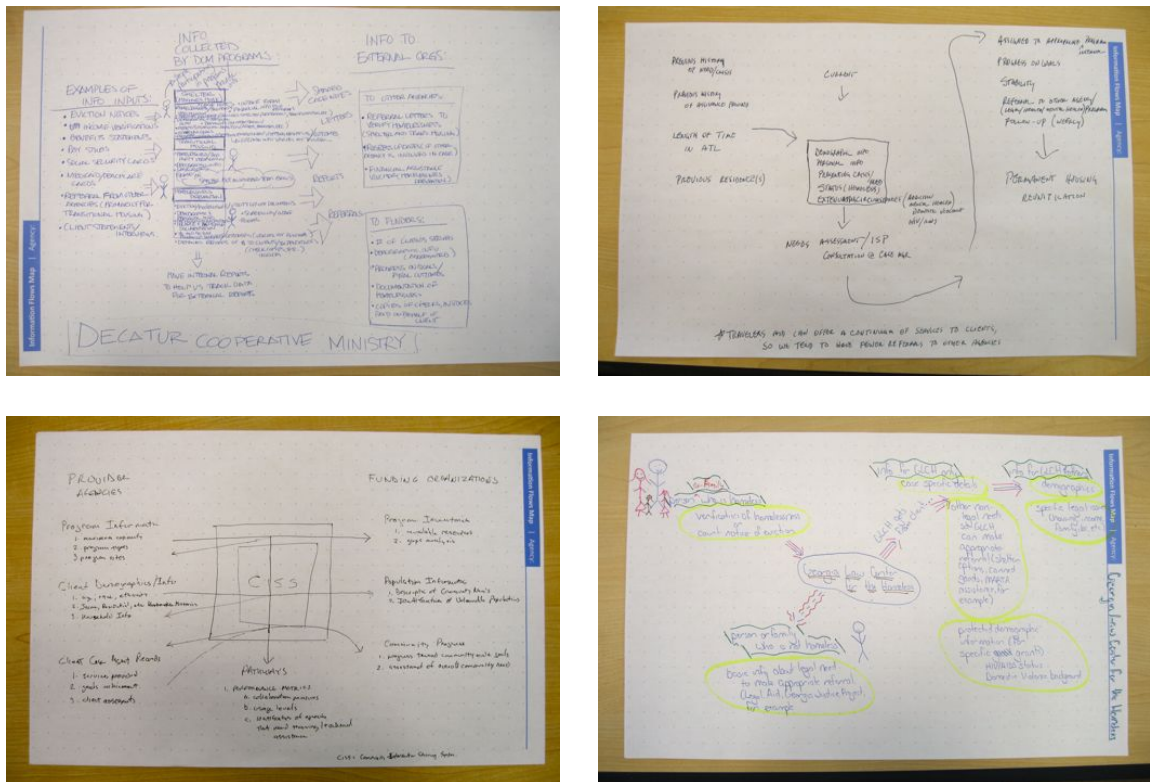


Figure 13: Several information flow diagrams from the workshop

other connections were in support of establishing outcomes and measurable effects to meet the requirements of grants and secure resources for ongoing care provision.

The information flow diagrams demonstrated how each service provider organized their programs—the flow from intake and needs assessment, through to external referrals and returning individuals to self-sustaining life. In some cases these activities were fairly linear with a relatively simple path through the organization, while in others, particularly for service providers with a broad portfolio of programs, the flows were more complex and consisted of several internal silos of information.

8.1.3 Mapping Goals

The final exercise of the design workshop also used cards, and involved documenting the goals clients at each service provider were intended to accomplish while enrolled in the various programs. The goal cards allowed participants to provide a goal name,

space for pre-requisites, and space for next-steps. Like the resource exercise at the beginning of the workshop, the participants were asked to create a card for the smallest discrete goals they could—a goal card of “become stably housed” was not particularly useful, but one for “create sustainable monthly budget” was as it lent itself to an activity more easily scoped and with fewer external contingencies.

I also asked the participants to keep the different resources they had in mind as they completed goal cards so that there would be clear connections between the two—the goals and the resources available to help the clients accomplish them. Like the resources cards, the goals cards also marked kinds of destinations on the conceptual map. For some of the organizations, the destination was a referral to a program providing the next steps, for others, the goal card was an exit from receiving care.

8.1.4 Synthesizing Resources, Information, & Goals

In the final session in the design workshop, I had the participants sort all of the materials together (see Figure 14). Since the workshop was about building a conceptual map, I asked the participants to lay everything out in front of them and connect each of the different elements together. Goals were sorted against the resources that supported the completion of each goal; several participants took the initiative to organize the goal and resource cards according to a hierarchy that reflected how they imagined clients should progress through their programs. These sorted stacks were then oriented against the information flow maps. Due to the scale of the cards and the maps—some of which were very densely rendered—the connections had to be explained rather than spatially demonstrated.

Each of the activities contributed specific elements to the map: the resource cards provided points of interest, the information flow diagrams described routes of connection between different service providers, the goal cards a kind of direction or trajectory through the resources, by way of the information connections. This view of

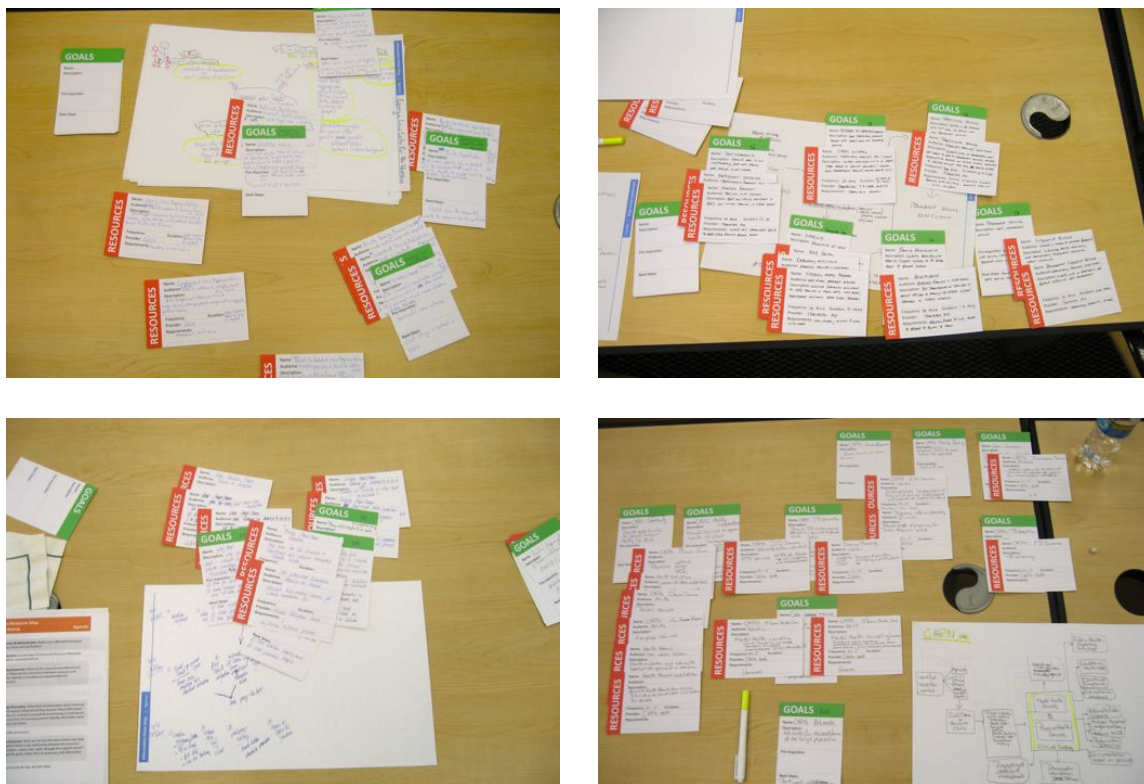


Figure 14: Synthesis of resources, goals, and information flow

of the resources, goals, and information flows within the participating group of care providers enabled me to gain both a broad and detailed view of how the different providers were connected as they helped different but often overlapping segments of the homeless population. By analyzing the materials from the workshop, I was able to generate a map of the service ecosystem around the specific goals, resources, and chains of referrals in which clients would be participating; the details came through the individual steps at each organization and the details provided for how those steps would be completed and supported.

8.1.5 Primary Site Selection

I selected my primary research site by looking for an organization with ties across the network of providers I had been involved with. The organization I chose had connections to all of the other providers and through those connections provided an

opportunity to develop a system that could encapsulate a diverse set of information for a segment of the homeless population with multiple and diverse needs (*e.g.*, childcare, healthcare, job training and placement, financial aid, and subsidized housing or transitional programs).

The chosen organization was an emergency shelter that provided 30 to 90 days of emergency housing for single women with their children. Up to eight families could be at the shelter at a given time and the programs at the shelter focused on assisting the women find long-term housing (families were placed into transitional housing or apartments), employment, childcare, and assistance securing any financial aid or social benefits they may have qualified for. The diversity of services provided to the women at the shelter, along with the connections to several supporting and partnering organizations made my primary research site the best setting in which to explore the role of ICTs and mobile computing in helping the staff and residents work with each other. With my primary site selected, I then transitioned into participatory design activities with the staff and residents at the shelter—doing so under the rubric of two publics.

8.2 Design in the Context of Two Publics

Working from the notion of publics developed in Chapter 7, I began working with the staff and residents at my primary research site. I argue that these two groups can be profitably viewed as publics in their own right: they share a set of issues and they engage in action to achieve desired outcomes with respect to those issues. The conditions that constitute a public go beyond the immediately shared goals or desires of a group of people and include the direct and indirect consequences of externalities: for the shelter staff this would include the policy landscape in which they operated, their accountabilities to grant makers and funders, and their responsibilities to the homeless they served; for the homeless residents at my primary site it included the

neighborhood in which they lived (even if temporarily), their social networks, and the range of service providers upon which they depended.

My early fieldwork gave me some notion of the issues confronted by the staff and residents at my primary research site and treating them as publics provided a perch for my design encounters that made space for each to actively participate in the design. I staged my design work so as to alternate between engagements with the staff and engagements with the residents. By doing so I was able to deepen my understanding of each as independent publics and vet design ideas across both groups.

The first several weeks of my design work involved the staff at the shelter. I met with the shelter's program director and the three supporting staff. These interactions were a mixture of un- and semi-structured interviews to better understand the specific work practices at the shelter (and to relate those work practices to the broader picture developed during the design workshop). During this period, I was looking to verify findings from earlier fieldwork at different research sites, and to develop some specific entry points for discussing and co-designing the Community Resource Messenger (at the time, we did not know what shape the system would take).

After working with the staff for several weeks, building rapport and earning their trust, I then turned to work with the current residents at the shelter. Following similar un- and semi-structured interviews, I began probing the residents about the challenges they faced, the kinds of activities they were engaged in and the kinds of information they needed and the kinds of information they had to share with fellow residents. As with the staff, these interactions were designed to verify findings from earlier fieldwork and provide specifics about the issues with which the residents were dealing.

8.2.1 The Public of the Shelter Staff

Generally, the care provider public is one that more clearly aligns with existing social institutions—namely, the non-profit and government service providers that provide social services to the homeless and very poor. As a result, the work necessary to establish a care provider public was lessened because of the institutional infrastructure already in place. Despite the presence of different institutional infrastructures, there were specific challenges the staff at my primary research site faced that delineate them as a specific public.

The first challenge centered around the resource constraints placed on staff both in supporting ICTs present at the shelter and in developing and maintaining expertise to effectively use those ICTs in the provision of social services (Le Dantec & Edwards, 2008b). These constraints often meant existing systems went underutilized because they added complexity to care provision. The staff wanted support systems that had little management overhead and that helped them build and maintain the connections they needed to do their job (connections within the shelter as well as to external organizations).

Second, the staff had to develop and manage multiple relationships as they were responsible for multiple residents at a given time. This issue had direct bearing on the residents of the shelter as well because effective care often depended on developing and maintaining close relationships with the mothers at the shelter. One of the consequences of this issue was that the staff became the preferred source for information about social services and aid programs for the residents which often led to situations where the staff were a bottleneck in helping each of their clients find resources.

Third, care provision relies on cooperative action, requiring varying degrees of coordination between individual staff members as well as across distinct organizations. This issue created a mix of consequences the staff had to manage; some in relation to

external accountabilities and some in relation to specific case management and client needs (Le Dantec & Edwards, 2008b).

In addition to these issues, which highlight some of the challenges the staff at my primary research site faced, there are also strong shared beliefs within particular organizations. The shared philosophies of care provision and social service, often expressed through an agency's mission, further establish definition around the kinds of actions staff take in response to identifying and managing consequences facing their homeless clients. As with most any organization, there are often tensions around these beliefs, tensions that were negotiated through practice and enforced via established authorities within the organization.

8.2.2 The Public of the Shelter Residents

The *prima facie* social condition that generally define the homeless as a public is the fact of their homelessness. Yet within this larger defining feature rest a number of more specific issues, many of which are particular to specific segments of the homeless. The following are the specific issues that were expressed by the residents at my primary research site.

The first of these finer grained issues focuses on information access by the residents. For the residents at my primary research site, information overload was a defining issue as they had to manage information from multiple care providers, from family and friends attempting to provide help, and from fellow residents offering advice and guidance on how to navigate the various social institutions in place to provide aid.

The second social condition that defined the residents as a public was that of maintaining social support. As others have noted, maintaining social support is critical when managing the crisis of homelessness (Hersberger, 2003; Le Dantec & Edwards, 2008a). When a person becomes homeless there are two issues that complicate maintaining social connections. The first is the practical difficulty of staying in touch once

a stable residence is lost. The second challenge comes from coping with the stigma of being homeless and the desire to maintain an image of stability for friends and family who might otherwise be concerned (Le Dantec & Edwards, 2008a). Both issues were present for the mothers at the shelter; they often talked of missing the support of former neighbors and friends to look after their children while they were displaced at the shelter.

Third, was the issue of developing and maintaining trusted relationships with the staff and with fellow residents. The challenge here was that for many of the mothers, the default position with respect to social institutions and individuals offering help was one of distrust—either from previous bad experiences or as a result of going through personal upheaval. For the residents, and for the staff providing care, developing a trusted relationship was key to successfully navigating social services and ultimately arriving at a position of self sufficiency.

Finally, the public of the residents is transient and impermanent. The mobility of the population and the social conditions within the shelter often worked against the emergence of the kinds of social structures that would sustain a homeless public: the mothers co-habited the shelter for a brief period of time and often had little else in common. Even as many of the residents expressed similar issues, when discussing those same issues as a group there was a sense of discovery that others were going through the same thing—this suggested that for the mothers at my primary research site, the overarching challenge was of articulating the shared issues so that individuals affected by them can begin to develop an identity as a public and move toward taking shared action.

8.3 System Design: From Map to Messenger

The design of the Community Resource Messenger was conducted through several weeks of alternating sessions with the staff and residents at the shelter. The design

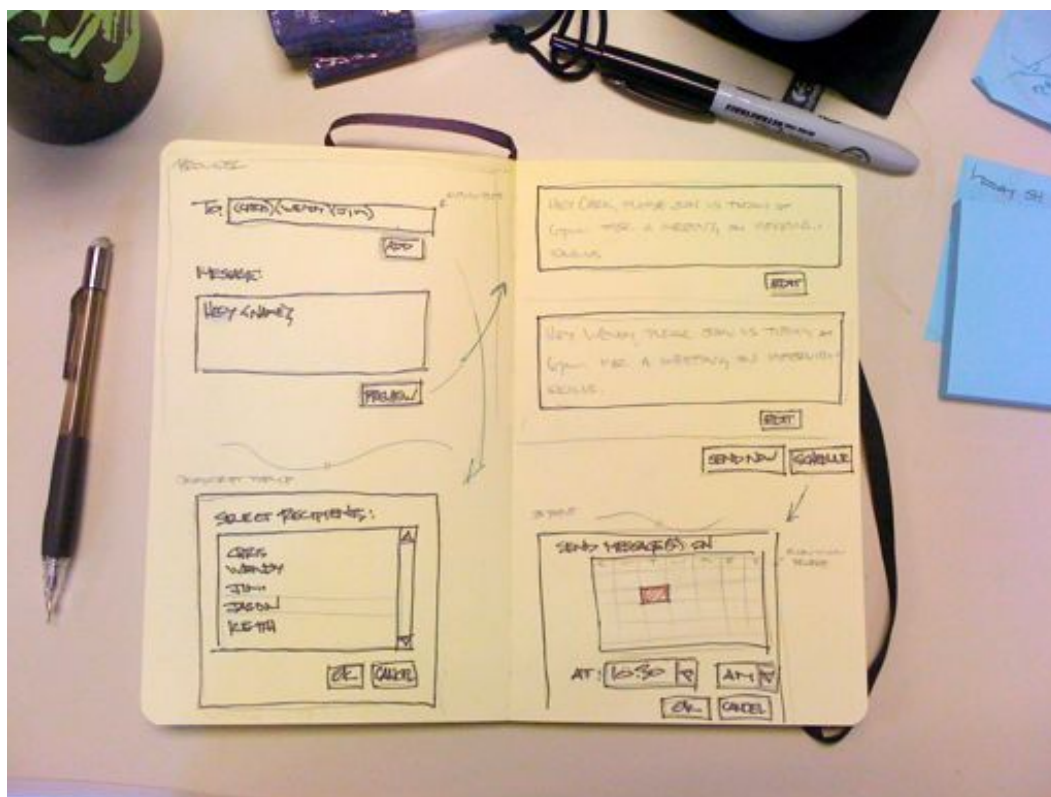


Figure 15: Early design sketch of the interface

sessions followed the fieldwork described above and revolved around developing a set of ever-higher-fidelity prototypes. I began with rough design sketches (Figure 15), then progressed to paper prototypes (Figure 16, below), and finally through more functional software prototypes (Figure 17, below). To develop these prototypes, I conducted a range of design encounters at the shelter: I held one-on-one design meetings and focus groups with staff, including program managers who set the direction for specific aid programs and staff who worked more closely with the residents themselves; I held group design meetings with shelter residents, some of whom had just been admitted into the shelter, and others who were preparing to move on to transitional housing programs.

I prepared an initial—and very rough—system design to facilitate my discussions and activities with the staff and residents. My initial concept of the Community Resource Messenger was as a “Community Resource Map,” and derived from the

design workshop as a collection of resources for the residents, updated by staff and available through a mobile application. These resources would include, among others, information about shelters, counseling services, soup kitchens, employment training, and healthcare. In the workshop I identified challenges in referring clients across agency boundaries, which led us to conceive of a map as an aggregated resource database—a map of available resources mediated by the individual preferences, needs, and goals of the homeless individuals using the system. To compliment the map, I developed a design prototype around on-phone software that could provide location-based notification of resources and opportunities.

This initial concept was the departure point for iterating and evolving the design with the shelter staff and residents. One of the first things I discovered was that while the map concept was useful as a way to expose resources in the community, the more fundamental challenge faced by both publics was managing communication: staff mediated access to various resources, so supporting information exchange and social interaction around those resources took priority over mapping. In recognizing this, I shifted focus away from developing a map, toward developing a set of services to support communication within and between the staff public and the shelter resident public. This shift led toward creating a Community Resource Messenger, where the design space I was engaging centered on the boundary of the two publics and developing communication channels to support them at that boundary. For the staff, the focus was on supporting their need to manage multiple relationships, coordinate actions around service provision, and deal with resource constraints. For the shelter residents, the focus was on structuring the information they received to help with information overload, establishing and maintaining relationships at the shelter, and developing a network for social support.

The final system, as Community Resource Messenger, included three main components: a Message Center for the staff, a Shared Message Board in the shelter for

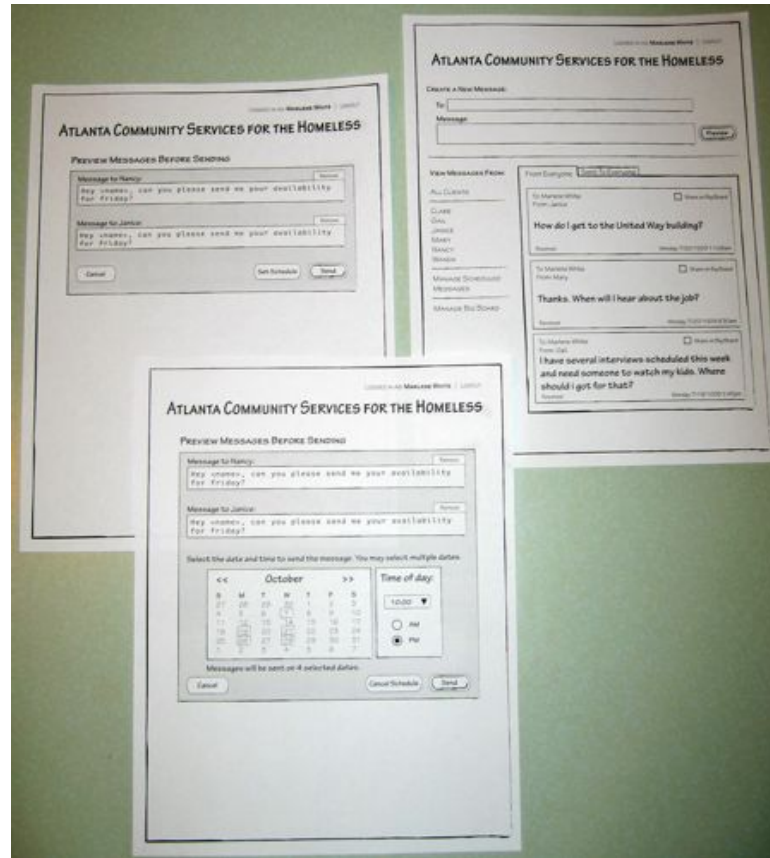


Figure 16: Paper prototypes of the Message Center interface

both staff and shelter residents, and Mobile Messaging support for shelter residents. The staff would have access to the Community Resource Messenger via a web application to help them manage communication with all of their clients and coordinate support activities. The Shared Message Board would become a fixture in the shelter to disseminate announcements from staff as well as collect messages and inquiries from residents. The shelter residents could interact with both systems via SMS or voice as a matter of preference. I turn now to describe how each of these core features developed through the design process, highlighting some of the specific issues that arose and how I worked to address those issues. For a comprehensive guide to all of the features of the Community Resource Messenger, please see Appendix B.

8.3.1 Design Evolution: Message Center

The Message Center was built primarily to support the staff and address the larger issues of managing multiple relationships, coordinating the action of case managers as they worked with shelter residents, and coping with constrained resources. However, through the use of the Message Center I would also be addressing some of the issues faced by the homeless, such as building and maintaining trusted relationships (specifically with the staff) and gaining access to organized and timely information.

I began by developing the design discourse with the staff and residents around how information was shared at the shelter. I examined the different ways information was made available to shelter residents, both through one-on-one communication between various staff and through shelter-wide information sources like bulletin boards and announcements made during communal activities. The first pieces to take shape were features for composing and scheduling SMS messages to residents, making it easier for a case worker to manage their communication with multiple mothers. The challenge and opportunity here was two-fold: some of the staff already had an established pattern of using SMS to communicate with residents and needed more robust support for using that communication channel; other staff had limited experience with text messaging—for example, the program manager of the shelter was initially skeptical about using SMS to communicate because it was not something she herself engaged in.

Using SMS as a starting point, I began to explore how a messaging system might look. The first thing I noticed was that SMS messages, by virtue of going through staff personal phones, were private. At the outset, I assumed that such privacy would be a central concern for the staff; that they would prefer to maintain a privileged relationship with the residents and not have their messages accessible to other staff. To support this, I began by assuming each case worker would log-on to the Message Center and see a list of the privately sent and received messages with their assigned

residents. I also proposed the ability to reply to messages privately with conversation threads reflected in the interface. These features combined to create an email-like experience where messages arrived in an inbox and could be filtered and sorted in various ways.

Yet as the design developed, the staff pointed out that they really needed to see not only their own messages, but all messages that came into the Message Center including those directed at and sent by other staff, noting that they had shared responsibilities across residents and that it was more important to establish a shared context for action than to cordon off each other's messages.

This prompted a fundamental change in how access to messages was provided in the Message Center. Instead of treating the messaging system as one might an email account—where each user's messages remain private—the Message Center became a shared message forum. I allowed case managers to see all of the messages regardless of which case worker originated the message or to whom it was addressed. This change had important implications for treating the staff as a public: it provided an additional persistent social context around which to organize action. The staff contended that such a shared context would help surface issues their clients were facing, enabling access to shared expertise while reducing the overhead of keeping everyone up to date.

For the residents of the shelter, the Message Center also provided a perch from which to address the dynamics of information overload and maintaining trusted relationships. Message automation was a feature that I initially thought would be compelling for both the staff (as a way to streamline their interaction with the system) and for the shelter residents (as a way to reduce information overload through timed and triggered message delivery). However, the automation features were initially scaled back for two reasons: the kinds of resources and events the staff wanted in the Message Center were contingent on their own expertise and judgment with respect to

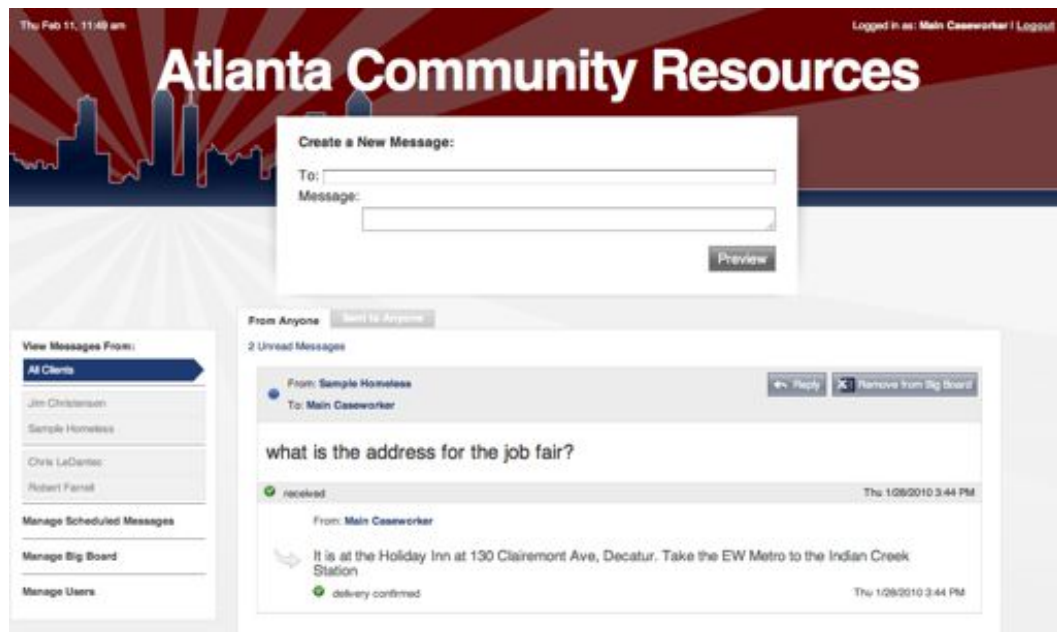


Figure 17: Final Message Center interface with mock data

prioritizing and negotiating access (especially for services at external providers), and there was an expressed concern that automation would erode the trusted relationship between staff and the residents by virtue of messages failing to reflect the tone and tenor of individual staff-resident relationships.

I found middle ground by providing the ability to schedule messages and to send group messages that would appear as individually addressed. On the first account, scheduling messages was seen as a way to provide timely reminders—something both staff and residents wanted as they set schedules and managed some of the daily chaos at the shelter. On the second account, personalizing group messages allowed for some kinds of group announcements to be simplified without giving up control over how the message was created.

8.3.2 Design Evolution: Shared Message Board

The Shared Message Board was a feature that emerged toward the end of the design process. It became clear from discussions with both staff and residents that direct private communication within and between the two publics had limitations. Namely,



Figure 18: An existing bulletin board at my primary research site

private communication made it impossible for the two groups to develop a “public memory.” For the shelter staff this implied a large corpus of “cyclical” information they were imparting to new residents roughly every 30 days. For the homeless residents, it was the inability to preserve the knowledge and experience they accumulated as they progressed through the programs at the shelter.

In addition to the cyclical information shelter staff communicated to the residents, the shelter had a number of paper bulletin boards for announcements, job postings, housing postings, and general “information awareness” between staff and between residents (Figure 18). One case worker said that these boards were often ignored in large part due to the density of information collected: job and housing listings were often pages deep and affixed to the board in such a way as to make it difficult to leaf through the content. As we explored these issues, one case worker specifically asked for a large display they might use to share information. The stable cyclical information could be made visible, prompting case worker client interaction around specific needs, and volatile information like current housing opportunities could also be made available in a more accessible and timely way.



Figure 19: Shared Message Board prototype (left) and v1 (right)

Beyond the information coming from shelter staff, I wanted to create a space for residents to share information with each other. My discussions with the residents started with thinking about whether there were experiences or knowledge they would want to share on such a board. As I reflected on how sending messages about opportunities, and requests for help or knowledge might work, the residents shifted from talking specifically about the things they might need at a given time to thinking about kinds of messages and information that would help future residents as they came to grapple with similar challenges. This led us to create a path for posting messages to the Shared Message Board via SMS or by leaving a voice mail that would be transcribed from speech to text and then posted.

From these discussions, I built a mockup (Figure 19), and considered various types of messages that might be posted. There are several things to notice about this design. First, the message board is a space for both staff and shelter residents to share information. This represents an innovation within the shelter as the existing bulletin boards did not provide space for residents to post messages. Second, the Shared Message Board facilitated dialog between staff and residents, providing a living

space for exchange. To organize this dialog, I needed a way to thread messages around request and reply. One common request and reply pattern that came up during design discussions was question and answer—whereby staff could reply to shelter residents’ posts to the Shared Message Board. Third, and finally, the display scrolled information across the board to accommodate many messages and presents a dynamic display to attract attention (Park & Nam, 2008). The mockup also included a list of topics along the bottom of the display as an indication of the kinds of information currently in circulation on the board.

The initial design made the Shared Message Board a reflection of information in the Community Resource Messenger, with messages coming from many sources: mobile text, voice messages, e-mail, as well as messages promoted from the Message Center. The design made space for residents to expose common issues, leverage group expertise, and establish a set of common knowledge that can be sustained across resident (or case worker) turnover.

8.3.3 Design Evolution: Mobile Messaging

The third component of the Community Resource Messenger was the integration of mobile messaging. I chose to target mobile phones as the interface of choice for the shelter residents based on my earlier fieldwork that pointed to the utility of the mobile phone for the homeless. As further evidence of the importance of the mobile phone, I would note that during the design encounters, the shelter residents all had mobile phones of their own. Some had phones through low-cost carriers like MetroPCS, and others had phones through public programs like SafeLink.

During my trips to the shelter, several residents indicated that they were already receiving text message reminders from the staff. Shelter residents also indicated that query-and-response text-based services (*e.g.*, 1 800 FREE 411) were often more useful than interactive voice response systems because they did not require the user to write

down information, instead sending it right to their phone. As a result, I felt that the most sensible way forward was to keep the phone interaction as transparent as possible; no specialized software on the handset, instead, focusing on the social coordination via the staff's Messaging Center as a way to innovate how and when information from shelter residents might be shared with staff and arrive back to the shelter resident with answers.

My design conversations with the shelter residents also touched on voice-based services as an important way of using their mobile phone. A minority of shelter residents preferred voice-based services to SMS, noting that they did not mind reading an SMS, but they disliked having to send them. This was an important point of discussion because it was a design priority to engage the homeless shelter residents as a public, providing a means for them to share and interact with each other through and around the Community Resource Messenger—while I could not guarantee participation, I did not want passive consumption to be the default position of system use.

8.3.4 From Version 1 to Version 2

I will discuss the change made to the Community Resource Messenger along with results of system deployment in more detail in Chapter 9 § 9.4.1; however, here I will briefly provide an overview of changes that were implemented after the system had been deployed for 30 weeks.

The main area of change was the Shared Message Board as it had become a fixture of shelter routine and information sharing. I came back to this feature and heavily modified the design to include better management of categorized information from the staff, to better support housing and employment information pulled from the web on a daily basis along with maps to help residents orient themselves to where these opportunities were in the city, to show weather information, to provide additional support for the residents to share photos via MMS to the Shared Message Board.

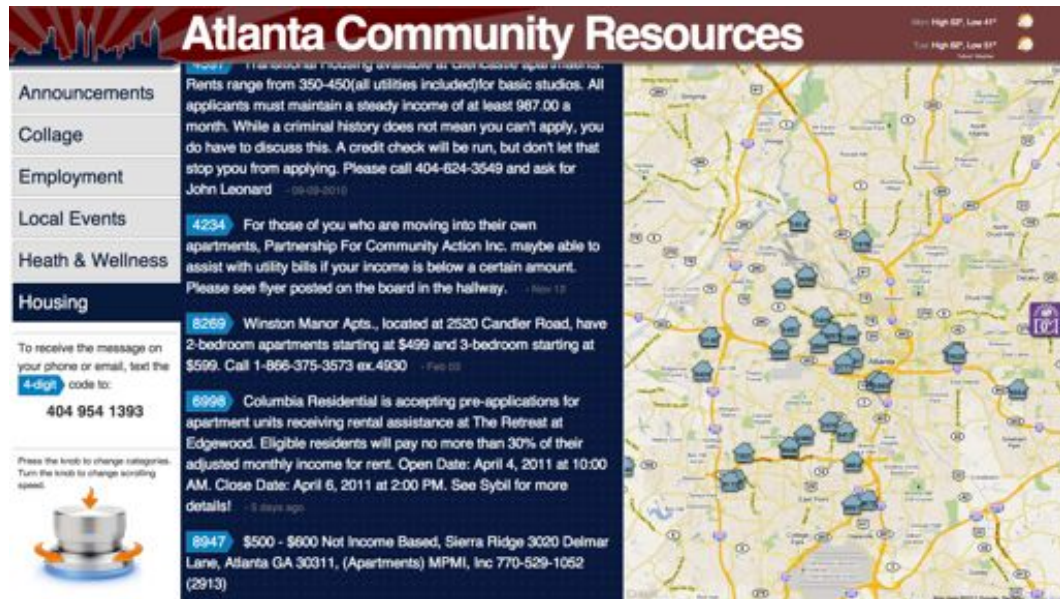


Figure 20: Shared Message Board v2 showing housing listings

Each of the changes to the Shared Message Board were made based on the accumulated feedback during the initial 30 week deployment and were intended to provide further insight into the kinds of information and interactions that drew staff and residents into using the system.

In addition to changes to the Shared Message Board, I also added support for subscribing residents to certain categories of information posted to the Shared Message Board. This meant that a resident subscribed to “housing” would receive new housing messages posted to the Shared Message Board as an SMS, thereby making it easier to know when new information was posted to categories they specifically cared about.

8.3.5 Details of the Final System

My onsite co-design with shelter residents and staff revealed a design space at the boundary of the two publics. This led us to a set of issues and questions that informed my design of the Community Resource Messenger. I came to realize that supporting cooperative action was a primary need for staff, so the Message Center evolved from



Figure 21: Community Resource Messenger system diagram

an email metaphor to that of a shared forum. I developed different views of public information, and concomitant democratization of access, by creating a Shared Message Board where the knowledge of shelter staff, the experiences of shelter residents, and information from the community could be actively created and interpreted by both publics.

Figure 21 shows a high-level view of the Community Resource Messenger as implemented at the homeless shelter. I have connected three loci of activity: shelter residents using mobile phones anytime and anywhere, staff using PCs while at home or at work, and both publics interpreting and acting on information on the shared display while co-located at the shelter.

Shelter residents access the Community Resource Messenger through basic mobile phones, sending messages or leaving voicemails at one of the system's two phone numbers: a "private" phone number routes messages to the case worker; a "public"

number routes messages to the Shared Message Board. Voice-mails are transcribed using Google Voice and forwarded to the Message Center or Shared Message Board via email.

Staff create messages in the Message Center which are either published on the Shared Message Board or scheduled and broadcast to residents' mobile phones via the Kannel GSM gateway. All messages are stored in a MySQL database accessed through JDBC. The Message Center and Shared Message Board are deployed on Apache Tomcat as Java web applications along with supporting Javascript to control presentation and updates in the browser.

The Shared Message Board runs on a large display installed in the entry hall of the shelter. It rotates between the different categories of information. In the first version of the Shared Message Board there were three different information views: messages from staff that originate in the Message Center, messages from residents that come from SMS and voice messages sent into the system, and external community information pulled in by scraping results from a housing search web page. In the second version, the categories were expanded and additional support information was added (more detail is provided in Chapter 9 § 9.4.1).

8.4 Reflecting on the Design

I began this chapter by framing my design intervention with the notion of designing for two publics. It is useful to return to this notion and examine where it led to useful insight.

8.4.1 Constituting Publics in Technology

With respect to the design of interactive systems, two key implications can be drawn from Deweyan publics. The first is that a public can become a useful boundary for design by highlighting existing social conditions, suggesting a conceptual space within

which to engage potential users around reflecting and acting on that condition (DiSalvo, 2009). During the design of the Community Resource Messenger I came upon two strong social conditions that arguably did the most to shape the system around each public. For the public of the staff, evolving the design of the Message Center to one of a shared forum (with respect to other staff) instead of private mailboxes meant that shared action could form around the exposed conversations instead of through additional coordination and interpretation work. For the residents in the homeless shelter, the development of the Shared Message Board became an important interface in facilitating awareness within the residents' public and promoting how each of these publics become aware of the other's experience.

While messages in the Message Center remained privileged, if not strictly private, the content posted to the Shared Message Board was for all eyes to see, creating a unique interface between these two publics where the consequences being dealt with (homelessness and the many social struggles that attend it) were managed from two different perspectives—that of care provider, those intervening, and that of shelter resident, those directly experiencing. By creating a single space where both publics could be represented, I created an opportunity to sustain and organize around the differences present in how each public identifies and responds to the other.

The second implication draws on the notion that publics not only expose common issues, but also are a means for dealing with conflict and controversy around those issues (Marres, 2007). From the point of view of how the Community Resource Messenger took shape, the open forum model of the Message Center had an important implication on the level of trust and openness when communicating via the system. The decision to present the Message Center as a shared forum meant that the individual relationships between case worker and residents were made subordinate to the relationship between case worker public and shelter resident public. On one hand this makes it easier to promote issues of the public (*i.e.* shared across several individuals)

but on the other hand it is more difficult to bring equanimity to existing power dynamics: the resident public was exposed to the case worker public in a way that was not reciprocal.

One of the main differences in how each public engaged with design of the Community Resource Messenger can be articulated through how they worked through specific features. The staff had fairly functional requests of the system: ways to solve particular problems and manage specific aspects of their jobs. Upon reflection, I believe this was in large part because they already had social infrastructure in place to support them as a public—the organization of the shelter and their role in it. The shelter residents, on the other hand, had fewer specific functional requests, instead focusing on issues of awareness and developing social infrastructure to support their perspective. Their priority was to find ways to render their experience and expertise visible.

8.4.2 Constituting Publics in Design

There was evidence that the act of design participation, central to the constitution of a public, took precedence over the final artifact. This became especially apparent in my work with the homeless residents of the shelter. For the residents, the work they did by reflecting on their needs and preferences seeded the idea that they were more than just consumers of information. This shift from consumer to participant became evident during design discussions of the Shared Message Board. Instead of designing to suit their needs and expertise, they began to consider how to sustain their experience and expertise into the future, recognizing that they were only going to be in contact with the system for a short time, but the work they contributed could have a longer life.

This shift marks a change in how the Community Resource Messenger was perceived and a move to create a more lasting social infrastructure—a public—by laying

out their advice and foresight for future generations of shelter residents. As discussed in the previous chapter, this is the kind of infrastructuring work necessary for sustaining a public through awareness and through action (Ehn, 2008a).

Like the residents, the staff also recognized that future use was important: case worker turnover and staff changes meant the design choices they made and the problems they identified would impact future generations of shelter staff. The main difference between how these two publics approached designing for future use revolved around whether they were thinking of future actions (as the staff did in focusing on actions to coordinate care) or future awareness (as the residents did through using experiences to support future residents of the shelter).

8.4.3 Infrastructuring with a Useful System

Contrary to what Ehn suggests, the design of the Community Resource Messenger provided evidence that participatory design around publics does not in fact need to make a pragmatic choice between the design of a practical or useful system and design as infrastructuring (Ehn, 2008a). While design-for-future-use as infrastructuring and design-for-use as practical system design are different—one as the opening up of questions and possibilities, the other as the choosing and narrowing of possibilities through practical design moves—the two can compliment each other and coexist as a means of expressing the attachments between publics. The design process described here provides an example of how a co-designed, practical system can also do the work of infrastructuring by exposing attachments in different ways and providing affordances in the technology for responding to and shaping those attachments.

During the design of the Community Resource Messenger, much of the discussion was grounded in the everyday constraints of current work practices and information needs at the shelter: the relationship between shelter staff and residents; the accountabilities and obligations of shelter staff within their regulatory context; the

differentials in responsibility and institutional influence between residents and staff; and the need for communal support among the residents. These acute arrangements shaped how both publics matured the design and narrowed the possible activities that might be mediated by the Community Resource Messenger—focusing on forms of communication, kinds of information shared, means of making visible different perspectives on shelter life.

However, through these practical issues, a discussion of the dependencies and commitments of both shelter staff and residents emerged. Some of these relationships were as one might expect: shelter staff were committed to helping the residents and to maintaining an environment of support and encouragement; yet, the staff also depended on the residents to make efforts to find gainful employment, to successfully complete job training programs, and to enroll in courses of counseling. Conversely, the residents depended on the shelter for basic needs and help connecting to external programs for employment support, childcare, and legal aid (among others). The residents' commitments included helping themselves get out of the shelter and to maintaining private lives and a sense of self-respect and independence in the face of significant institutional dependence. The characteristics of these attachments—the different dependencies and commitments—expose facets of the social dynamics in the shelter that are more nuanced than the gross cleave between care provider and client. Certainly the staff were an authoritative structure, and the way that authority was wielded was under constant negotiation among the staff, and between the staff and the residents. The design and use of the Community Resource Messenger exposed these negotiations to the two publics by allowing different actors to influence the information and the discourse about available information through newly introduced channels of communication.

As the design matured and the Community Resource Messenger went into use, a shift took place in how the two publics engaged with the system and with the ongoing

design discourse. Instead of focusing on the current practical needs, the interaction became about the future arrangements of staff and resident and the implication for how they would relate to each other. The dependency of the residents on the shelter staff started to be reconfigured via the Community Resource Messenger by putting information and exchange from both staff and residents on equal footing, allowing both publics to take a measure of ownership of the technology and to appropriate its use and interpretation of its content independently.

CHAPTER 9

SYSTEM DEPLOYMENT

The deployment of the Community Resource Messenger began once the design and development of the system concluded in February, 2010. The deployment took place in two phases, the first lasting 30 weeks, the second lasting 16 weeks. In between these two phases was an 11 week period of system iteration where I made changes to the Shared Message Board, added capabilities for the residents to share images from their phones via MMS, and incorporated additional information from external sources on the Internet. Another difference between the first and second phases of the deployment was that the first phase was setup as an extension of the design work—I introduced the system as a work in progress and encouraged the residents to engage critically with it, telling me how it could be made better. In the second phase, my focus was to gain further insight into specific elements of use around the Shared Message Board and did not have the same explicit setup of on-going design as the first phase.

I contend that this difference had consequences in how the system was used. By structuring the first phase of the deployment as part of on-going design work, I was able to continue the design dialogue with the residents that encouraged them to be critical of the technology and their experience with it, rather than just taking it as a given, fixed component of their experience at the shelter. This setup became part of the work done to constitute the publics of the residents, and was not present in the second phase which exhibited different trends of use over the generations of mothers that participated. I will discuss these results and differences in more detail later in the next two chapters.

9.1 Deployment Structure

Both phases of the deployment were built around a systematic program of semiweekly meetings with shelter staff and residents to study how the Community Resource Messenger was being adopted. I held two one-on-one meetings with the shelter staff and residents each week to discuss their perspectives on the Community Resource Messenger and to understand when and how it was or was not meeting their needs. When working with the staff, I conducted un- and semi-interviews that were framed by the ongoing system use and any issues the staff were having with the Community Resource Messenger. This framing came by examining the ways the system was being used, looking at how many messages were being sent as well as the content of those messages.

For the residents, the study experience had three main components. Starting at intake, after explaining the study and obtaining informed consent, I gathered basic demographic data about each resident, including age, education, race, and data on ownership and use of mobile phones and personal computers (including questions about specific applications, *e.g.*, SMS on the mobile phone and chat, email, and social networking sites on the PC). To ensure residents could participate with the technology if they chose, I provided mobile phones (a Nokia E50) along with \$50 worth of pre-paid credit to residents who did not have their own phone. Residents who had their own mobile phones were reimbursed for expenses incurred from interacting with the system; no other form of compensation was provided.

The second component of the study for the residents was the semiweekly meetings held with the researcher. Meetings alternated between one-on-one interviews and focus group sessions. During these interactions, I would discuss how the Community Resource Messenger was being used, the specific features that the residents had found useful or irrelevant, and how its use was changing from week to week. Extensive

field notes were taken during these meetings, notes that were in turn used to inform subsequent interviews and focus groups.

The third component of the study was a one-on-one interview that occurred as each resident left the shelter. This final interview was more reflective about how they used the Community Resource Messenger while at the shelter, the nature of the interactions they had with shelter staff and with fellow residents via the system, and a discussion of any specific events or opportunities that arose via their use of the system.

The final source of data came from observational fieldwork I engaged in during my semiweekly trips to the shelter. Each week, I took time to observe shelter life and note how staff and residents went about their routines. These observations served to inform the questions I would ask of either staff or residents, and helped us contextualize their responses. During this time I became a participant observer: my presence in the shelter was regular and integrated into the routine of things. The residents would talk with me casually about their lives outside of structured interview sessions and I would often entertain young children after meals or help with small chores before or after the more structured interactions.

These data—the demographic survey data, notes from one-on-one and focus group meetings with the staff and residents, the exit interview data, the field notes from my ongoing site observations, along with detailed system logs and usage reports—provided the raw materials I used to analyze the Community Resource Messenger use and integration at the shelter. Field notes and interview data were analyzed in a rolling data analysis that allowed me to explore specific developments among the staff and residents during the interviews and focus groups. System usage data was used to help provide additional context around how the system was used and to triangulate my qualitative analysis with rhythms of life at the shelter across several generations of shelter residents.

9.2 Overview of Participants: Staff & Residents

The staff who used the Community Resource Messenger included three women: the program director, a weekend case manager, and a night manager. The program director ran the daily case management activities and had a very hands-on, face-to-face style of working with the residents. The case manager worked with the residents primarily during the weekends when the program director was not present, but was also present one night a week for additional followup and to support some of the specific programs she was working on with the residents. The night manager was only present in the evenings and was there primarily as an emergency contact—she had no formal case management responsibilities but she did play an important support role by being another confidant to the women at the shelter.

Over the course of the complete deployment, 38 residents at the shelter participated, 25 during the first phase and 13 during the second. All of the residents were female, and all but one self-identified as African American (the lone exception identifying as Hispanic). The average age of the residents was 33 years old with a maximum age of 53 and a minimum age of 20. The median age was 31. Education level across the residents was evenly distributed with the center of curve occurring at a high school (or equivalent) education: 10 (26.3%) had completed some high school, 16 (39.5%) had high school diplomas, eight (21%) completed some college, and 5 (13.2%) had a two- or four-year college degree. On average, residents stayed at the shelter for nearly 42 days, and groups of residents would typically arrive and depart at regular intervals—what I refer to as “generations” of residents.

Mobile phone ownership was common with 31 (81.6%) of the residents having their own mobile phone. Of those that owned their own phone, 19 of the 31 (61.3%) had monthly contracts; the remaining 12 (38.7%) used pre-paid mobile phone plans. Regardless of mobile phone ownership while at the shelter, the majority of the women used SMS messaging—34 (89.5%) reporting they used it regularly for staying in touch

with friends and family, with self-reported message volume ranging from tens (20+) to thousands (1000+) of messages per month. Personal computer ownership was much lower than mobile phone ownership with only eight (21%) of the residents reporting owning a computer; however, all of the residents used computers at least once a week through organized classes at the shelter, and a majority of the women, 23 (69.7%), reported using computers three or more times a week at locations like the public library, local charities, or at work. Computer use was described as including email and web at a minimum, with just over half of the residents—20 (52.6%)—also reporting the use of social networking sites (*e.g.*, Facebook).

These characteristics begin to paint a picture of the technology practices of the women who came through the shelter. They were familiar with mobile phones and with using SMS—often preferring SMS as a way to keep in touch with friends and family during the day. They also understood things like Facebook and the kind of mediated interaction that takes place through online channels. These familiarities helped the residents understand the Community Resource Messenger and the different modes of communication it afforded, enabling us to use similes for posting messages to the Shared Message Board as like posting on a Facebook Wall.

9.3 Phase I Findings

The use and adoption of the Community Resource Messenger must be understood given the constraints of the shelter it was deployed to: the women who came to the shelter were in a period of crisis, generally in a disoriented emotional state while also experiencing difficulty in practical matters. During their initial 30 days at the shelter, they would need to find employment (or better paying employment), establish childcare or enroll their children in school, and they would need to secure long(er) term housing arrangements. All of these tasks were done with ample help and guidance from

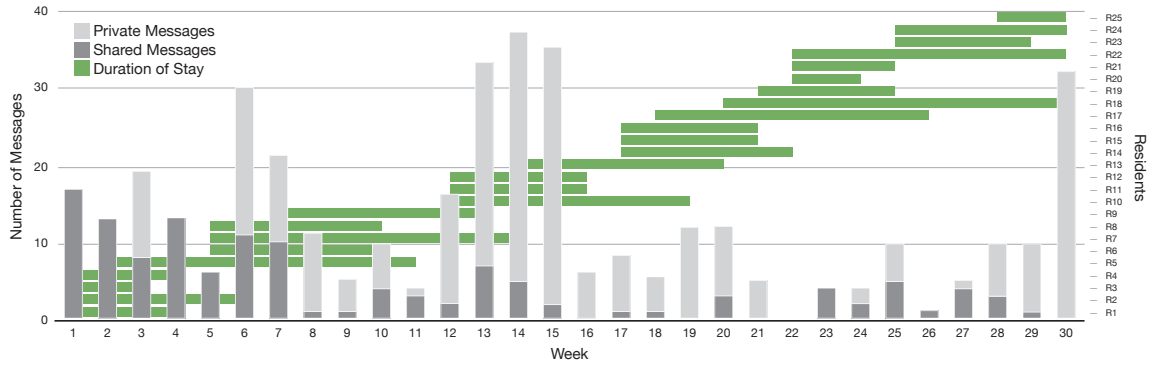


Figure 22: Phase 1 system usage pattern

the shelter staff, however, direct contact time had been limited to evenings, making in-the-moment assistance nearly impossible to coordinate.

9.3.1 Patterns of Use

By looking at the system usage data, we can begin to see how use of the Community Resource Messenger coincided with the rhythms of shelter life. Figure 22 provides detail on system use by overlaying two visualizations: the first depicts length of stay at the shelter via the green horizontal bars—each bar represents a shelter resident (R1–R25 from bottom to top), the position and length of the bar indicates the week of arrival through the week of departure; the second graph is a vertically stacked bar graph (in two-tone grey) indicating the weekly total of messages sent to individuals (*i.e.*, private messages in light grey) and the weekly total of messages sent to the Shared Message Board (*i.e.*, shared messages in dark grey) by both staff and residents. By layering the data this way, we can see how the generations of residents (weeks 1–4, weeks 4–10, weeks 10–16, weeks 16–21, weeks 21–25, and weeks 25–30) coincide with message volume cycles over the 30 week deployment.

The graph in Figure 22 illustrates the processional nature of use with the Community Resource Messenger—from the messy and erratic use during initial weeks of the deployment, through to a settled pattern as staff and residents appropriated the

system in support of the activities at the shelter. The irregular message volume during the first eight weeks of deployment came primarily as the staff began populating the Shared Message Board with information that had previously existed elsewhere in the shelter: phone numbers and addresses for ancillary programs, details about shelter procedure, external agencies serving specific needs, along with inspirational messages. After this initial setup work was done, the staff settled into a routine of updating the Shared Message Board as new information became available—a routine that resulted in a few messages per week.

By week six, the staff and residents had begun to send a larger volume of private messages via the Community Resource Messenger—a trend that continued through week 30. The shift toward a higher volume of personal messages tracks the arrival and departure of generations of shelter residents. When a group of new residents would arrive, private message volume was low (Figure 22: weeks 4, 11, 17, 22, and 26), but would then increase and peak as individuals in that generation of residents became ready to move on (Figure 22: weeks 6, 15, 20, 25, and 30). This cycle was in part the result of residents moving from personal crisis to stability and in part the result of the case management style of the staff who would progressively give the residents more responsibility.

While this pattern generally held during the first phase of the deployment, there were distinct characteristics of use within each generation of shelter residents. In particular, weeks 13–15 had a large volume of messages that did not reoccur until the very end of the deployment in week 30. To better understand what was different between the weeks of high and low message volume, I carried out a content analysis of the messages sent through the Community Resource Messenger. Two researchers coded each message according to one of 13 categories—topics covering specific resources like childcare, housing and employment, as well as topics like “case work” that covered

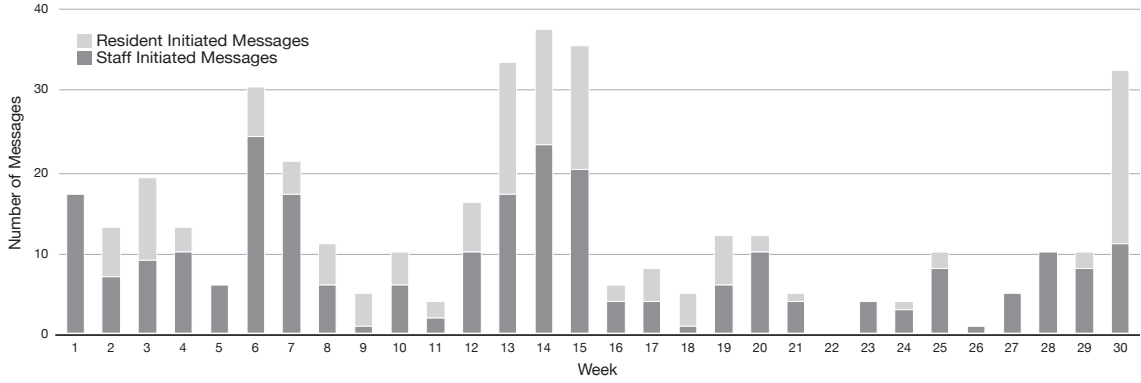


Figure 23: Phase 1 message origin, staff versus residents

coordination messages and “relationship work” that covered messages meant to establish trust and rapport. Inter-rater reliability ($\kappa=0.8984$ with $\sigma=0.0178$) indicated a robust categorization rubric for the content exchanged via the Community Resource Messenger. Based on my content analysis, further details about message origin, and my qualitative experience with the women at the shelter, I am able to attribute these peaks in use to the unique way the particular residents at the shelter during weeks 13–15 and again in week 30 bonded with the staff.

Throughout the first phase of the deployment, the staff accounted for 55% of the private messages (residents 45%, see Figure 23); however, the standard deviation was quite high at $\pm 25\%$; so from week to week, there was considerable variability in participation between staff and residents. During the weeks with a high-volume of messages, the split in participation between the staff and residents remained at 55%-45%, but the standard deviation dropped significantly to $\pm 11\%$, indicating a much more even participation. Moreover, based on my content analysis, it was clear, throughout the deployment, that staff and residents used the Community Resource Messenger for coordination around specific service procedures (*e.g.*, securing long-term housing, following up on employment, or managing childcare), but during the high-use weeks in question, there were messages that indicated a personal connection between the staff and residents (*e.g.*, “I really enjoyed the meeting yesterday evening.

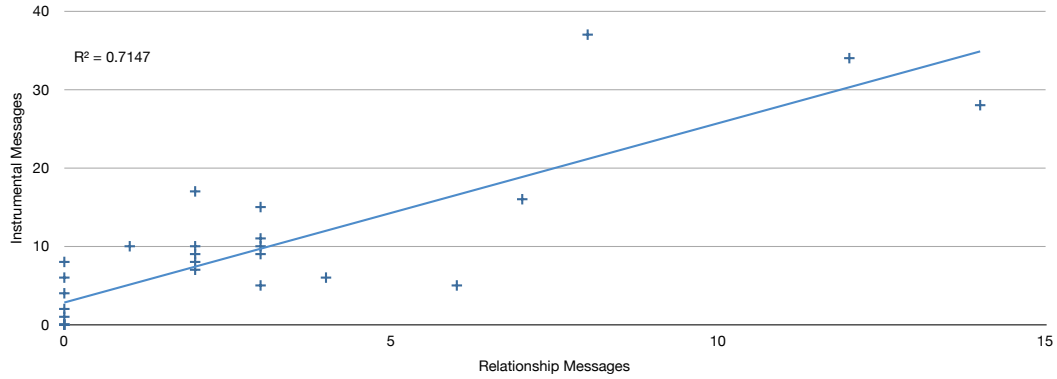


Figure 24: Instrumental messages versus relationship messages

Perhaps I should have more bonding and sharing experiences,” and “Thank you, I look forward to talking to you too”). This is important because it ties increased instrumental use of the Community Resource Messenger—using it to secure the services and resources necessary to move out of the shelter—with the experience of managing those resources vis-à-vis the relationship between staff and resident.

The relationship between instrumental messages and relationship-building messages can be seen in Figure 24. An increase in the messages that were coded as “relationship”—that is, messages whose content was aimed at building and extending rapport between the staff and residents—there was also an increase in number of instrumental messages. This increase was fairly linear ($R^2=0.7147$), and provides further evidence that the role of building rapport is closely connected to the residents’ gaining access to information via sustained interaction with the staff.

Overall, the cycle of use that developed during the first phase with the Community Resource Messenger is validation that the design was appropriate, useful, and usable for the staff and residents at the shelter. Yet, it also points to two important developments with respect to how the Community Resource Messenger supported the two publics of shelter staff and shelter residents and how technology use can be leveraged within the broader homeless community. First, given my initial design framing of supporting two distinct publics, the Community Resource Messenger needed to do

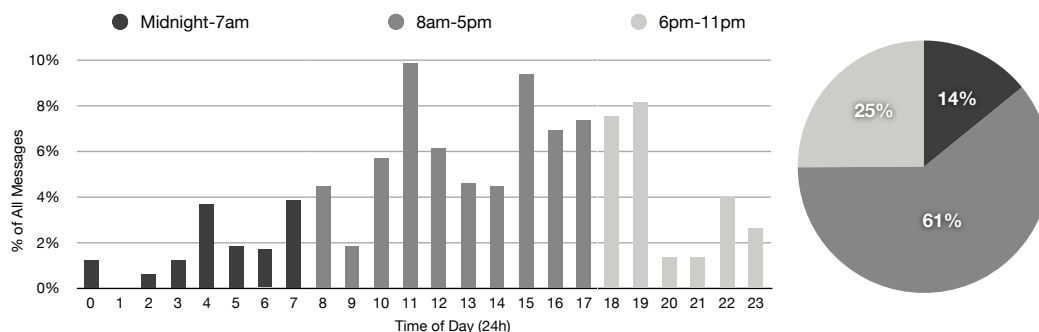


Figure 25: Time of day when private messages were sent

two things: it needed to support the articulation of common issues, some evidence of which is apparent in the content of the messages passed through the system; and it needed to support coordinated action around those articulated common issues. The staff and residents engaged in that common action when they used the Community Resource Messenger to share information about services and to accomplish micro-coordination to secure necessary services. It is important to point out that the action that was being taken through the Community Resource Messenger was new action never before possible—61% of the private messages exchanged via the Community Resource Messenger occurred during the day from 8AM to 5PM when staff had been previously unavailable to the residents (see Figure 25)—so it is not just that the Community Resource Messenger supported existing practices, but that it was instrumental in developing new practices.

The second point touches more generally on technology use by the homeless. As I pointed out above, the mothers at the shelter were familiar with using SMS, however, they used it almost exclusively for maintaining social relationships. This kind of social use is an important part of what digital technologies provide the homeless—a means of coping with stigma and maintaining some level of social inclusion (Roberson & Nardi, 2010; Woelfer & Hendry, 2010). However, translating non-instrumental use of technology into instrumental use has remained a challenge in no small part because the conceptual leap from viewing technology as abstractly useful to internalizing the

concrete ways it can help is often difficult as the incentives remain indirect (*i.e.*, it is not always clear how mastering Word will help individuals find work) (Kvasny & Keil, 2006; Pinkett, 2000; Pinkett & O'Bryant, 2003). However, with the Community Resource Messenger, the incentive to interact with the system was inherently social as it was based on the relationship between the staff and the residents. The outcome of that social use, however, was instrumental in that it connected the residents to the services and help they needed to move out of the shelter and on with their lives. In short, no conceptual leap was necessary for understanding how the Community Resource Messenger could make a difference for the shelter residents.

9.3.2 Experiential Data

While the system usage data and content analysis help shed light on which parts of the Community Resource Messenger were used, providing evidence of action taken via the system, the qualitative data from the semiweekly interviews and ethnographic observation provide empirical evidence about how and to what extent system use impacted existing shelter routines. To understand this impact, I return to the notion of publics as an analytic lens for examining how the Community Resource Messenger affected shelter norms, how relationships between and among staff and residents were affected during the first phase of the deployment, and how information sharing enlisted different forms of membership in the public of shelter staff and the public of shelter resident.

9.3.2.1 Redrawing Social Boundaries

The first point I consider is the way the Community Resource Messenger impacted the relationship between the staff and the residents at the shelter. In particular, the adoption of the Community Resource Messenger for diverse communication needs initiated a redrawing of some of the boundaries between these two publics.

During weeks 10–16, conflict within the shelter began to develop around the completion of required chores. Prior to the deployment of the Community Resource Messenger, such conflicts were handled with face-to-face confrontations between the staff and the residents. By week 10, however, the staff had begun to rely on the ability to send messages directly to the residents in place of some of that face-to-face interaction. During a particular episode when chores—such as cleaning common areas and tidying up after meals—were not being completed, the case worker used the Community Resource Messenger to send a message to several residents, writing, “I am not sure whose turn it is but I have knocked on your door to remind you that the chore assigned to your room was not completed. Please take this opportunity to determine who needs to sweep and mop the kitchen. Thank you M—”

This particular message marked a shift toward managing confrontation via the Community Resource Messenger. It also expressed a nascent tension between the case manager and program director. This tension was rooted in different notions of how to manage relationships with the residents. In particular, the program director felt that using the Community Resource Messenger to enforce shelter rules was not enough, and that the mothers needed to be confronted immediately when they broke those rules.

During an interview after this exchange occurred, the case manager defended her actions, asserting that sending the residents a message gave them the opportunity to correct their actions without being compelled through confrontation. In the case manager’s words, “it returned power” to the residents, allowing them to choose how and when they would respond to the message. This point is important on two counts. First, it highlights the tensions that arose from introducing new technologies into the shelter, and how those tensions expressed the dynamic way publics can reconfigure around particular issues—in this case the way shelter rules were expressed and enforced and the blurring of boundaries of authority as the case manager’s attachment

on the issue aligned with the residents rather than the staff. Second, it shows how a new form of staff-resident communication was instrumental in establishing a new social boundary that reduced intrusion for the shelter residents.

The redrawing of these social boundaries was facilitated not just by the ability to message someone while they were not present, but, as the case manager noted, by the fact that “the system [provides] a record that a message was sent.” This record created a perceived verification that a particular message was received, displacing the need for face-to-face communication to ensure accountability by the residents. As a result, the redrawing of social boundaries within the shelter was a combination of newfound mobile and asynchronous communication capacity, along with a concomitant capability to maintain the accountabilities previously exercised through direct interaction.

This freedom impacted the staff and residents differently. The staff could send a message to residents about a particular issue and feel they had appropriately transferred responsibility to the mother in question; the residents could choose how and when to respond to a message, thus asserting themselves without confrontation and engendering a capacity to establish boundaries according to their needs and not just according to the rules of the shelter. It is in this regard that the Community Resource Messenger supported the staff and residents as two distinct publics, allowing each group to respond to issues independently.

9.3.2.2 Sharing Information for Action & Identity

The next element of the Community Resource Messenger I consider is the Shared Message Board—a large screen mounted in the entry to the shelter (see Figure 26)—and its role in supporting the public of the shelter residents. The initial goals of the Shared Message Board were to provide a visible place for both publics—staff and residents—to share information. As the deployment unfolded, I found that the

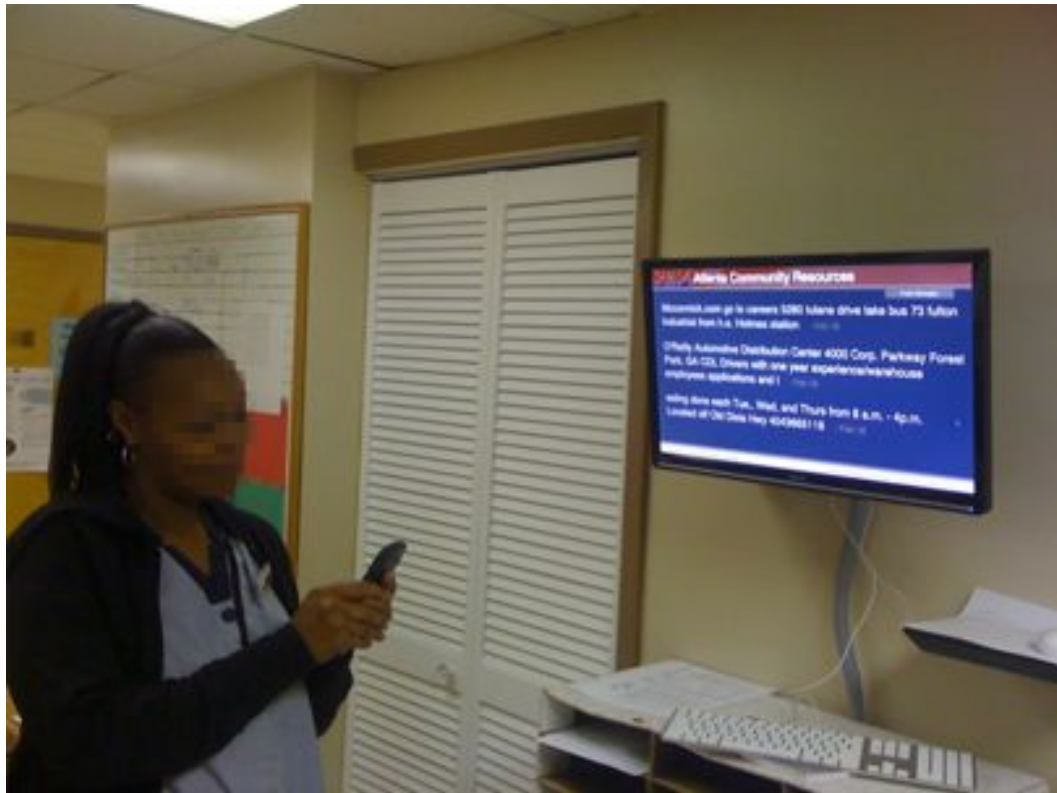


Figure 26: Shared Message Board in use at the shelter

message board became more than just a place to share information, instead becoming a mechanism for surfacing common issues and establishing shared identity.

For the staff, the Shared Message Board was initially seen as a means for providing basic information to the residents consistent with the cork and whiteboards already present in the shelter. However, the impact of the Shared Message Board became apparent in a particular incident during the run-up to the Easter holiday. In the weeks before the holiday, a paper flier about a free family outing had been posted on one of the existing cork boards. While the flier was on the cork board, none of the residents asked to sign up for the event. The week before the event, however, the case manager posted the same information on the Shared Message Board, noting in a subsequent interview that, “as soon as it went up on the [Shared Message Board], two mothers were interested and signed up [to attend].” She and the program director were genuinely excited about this development because it was a clear instance where

information on the Shared Message Board was more actively engaged by the residents than other forms of shared information (like the existing cork boards) had ever been. One of the reasons for this was that the animated display created an expectation that new information would appear on the screen, so the residents were naturally drawn to it as a source for daily updates.

Further evidence of how the Shared Message Board impacted the residents came when the program director watched a current resident demonstrate how it worked to a new resident. The fact that senior residents were spontaneously educating new arrivals encouraged the program director that the technology was becoming an important part of the residents' routines. This in turn led the program director to request additional features for managing information on the Shared Message Board—a request that the case manager pointed out as indicative of how well the Community Resource Messenger had been received at the shelter, especially given the program director's initial skepticism: “[the fact that] Ms. S— [the program director] wants more information up is a testament to its success.”

The Shared Message Board also supported the expression of issues among the residents and became a medium for taking action on those issues. In a message posted to the Shared Message Board during the incident when residents were not completing their chores, one resident said, “We came to [the shelter], it was a blessing for us all and we knew the rules right away... We agreed to do them but we're not doing [them]. This is the right thing and count my blessings and... keep it clean...”

The prominence of the Shared Message Board in the shelter made it a focal point for the public of the shelter residents. This was seen through the way residents responded to messages posted to the Shared Message Board, it was seen in how residents took it upon themselves to induct new residents into the routines of use surrounding the Shared Message Board, and it was seen through instances of self-organization that

were mediated by the Shared Message Board. In particular, posting a message reminding fellow residents of their commitments was an act of articulating and organizing action around a particular issue. But more than just managing shelter chores, I would point to this incident as one where the women at the shelter identified themselves as a cohesive group—a public—confronting common issues. It might seem mundane to organize around chores, however, for the women at the shelter, all from very different backgrounds, thrown together for a brief and tumultuous period, establishing shared identity and supporting each other was an important event. The role of the Community Resource Messenger in constituting this nascent and transient public came by providing a platform that helped the residents express and self-organize around these common issues.

9.3.2.3 Destabilizing a Stable Public

Finally, I turn to the ways in which the Community Resource Messenger impacted the work practices and responsibilities of the staff and how it altered different roles within the shelter. By adopting this system, the staff had implicitly agreed to new forms of work: they would need to update messages on the Shared Message Board and develop routines for checking messages sent to them by residents. Both of these tasks would need to be done in a timely manner and would need to be integrated into existing case management activities.

The most significant change that came with the introduction of the Community Resource Messenger was that the division of labor was refactored, placing most of the responsibility for updating the system on the case manager. As a result, as use of the Community Resource Messenger became more established, it shifted the balance of power: by virtue of using the Community Resource Messenger to message residents and post information to the Shared Message Board, the case manager's role at the

shelter was amplified. The consequence of this was that dormant ideological differences between the program director and the case manager were amplified as well.

These tensions were exposed as a result of a very specific design decision about how information would be shared among staff at the shelter. During the participatory design phase, the staff made a significant change to how the Message Center worked; instead of treating each staff login as private, the decision was made to treat the Community Resource Messenger like a forum where staff could see all messages. The rationale was that it would help the staff better coordinate action during the handoffs from week to weekend care by enabling better contextual awareness of what was going on with each of the residents.

While this was true in use—the staff did have better awareness of ongoing communication—that awareness was limited and imperfect. The brief nature of messages sent to mobile phones (typically adhering to the 160 character limit of a single SMS message) meant that the larger conversation, one that often started during a face-to-face meeting, was difficult to ascertain. Furthermore, the forum-like qualities of the Community Resource Messenger became an invitation for the program director to surveil the activities of the case manager. In one specific instance, the program director reproached the case manager for contacting a former resident with what had been mistakenly interpreted as an invitation to an event for current residents. The result of this exchange was that the case manager temporarily stopped using the Community Resource Messenger, a fact reflected in the message volume of week 22 (see Figure 22).

More fundamentally, however, was the way this interaction affected how both the case manager and the program director framed their roles within the shelter—and as such, their roles as members of the staff public. There were two factors that affected this reframing. The first was that the Community Resource Messenger provided the case manager an effective tool to extend her contact with the residents. By being

able to message them more easily, she was able to keep in touch during the week and maintain better continuity with the mothers at the shelter. As she put it during an interview, “I see part of my job as building rapport with the mothers.” However, by using the Community Resource Messenger to extend her relationship with the mothers, she initiated the second factor, which was that the case manager’s heavy use of the system raised her visibility to the residents and changed some of the established power dynamics at the shelter. Prior to the Community Resource Messenger deployment, the program director had the most contact time with the residents and established a strict relationship with them. She enforced the rules and often made difficult decisions on how to distribute limited resources. Meanwhile, the case manager acted as a confidant and advocate for the residents, a weekend-only foil to the “tough love” provided by the program director. As the case manager began extending her relationship via the Community Resource Messenger, the center of influence shifted, amplifying the nurturing role of the case manager.

At its core, the issue here centers on how using the Community Resource Messenger redistributed power and influence along different notions of how to establish effective relationships with the residents at the shelter. While the public of the shelter staff was something I presumed as stable during the design phase, the Community Resource Messenger created an environment where the prior attachments to shared issues became altered, in this case initiated a renegotiation between the case manager and program director on how to build and maintain appropriate relationships with the residents. Yet despite these tensions, both the program director and case manager remained enthusiastic about the role Community Resource Messenger had in sharing information with each other and with the residents.

9.4 Phase II Findings

The second phase of the deployment followed a redesign of the Shared Message Board, the addition of photo sharing via MMS for the residents, and a content subscription feature that would send new messages from selected categories to the residents' phones. The second phase ran for 16 weeks and the setup and involvement was lighter weight: rather than focusing broadly on the impact of the Community Resource Messenger on the routines of shelter life, I was only concerned with understanding the relationship to the Shared Message Board, and the new features aimed at creating a different kind of social incentive for sharing (via photos) and for making new information more apparent (via subscriptions).

9.4.1 New and Refined Features

Throughout the first phase of the deployment, two consistent themes developed among the staff and residents regarding their interaction with the Shared Message Board. The staff desired the ability to present information in a more categorized manner; the residents wanted an easier way to find new posts to the message board and to have a little more interaction while in front of the screen.

During the first phase, the staff established a rhythm of adding information to the Shared Message Board. Some of the messaging was opportunistic, but generally, each week, there would be a few new messages to add to the board. During this time, and incidental to the Community Resource Messenger deployment, the staff had begun to reorganize the way they documented the kinds of services current residents were seeking and which immediate needs they should meet. This documentation was broken down along several categories: childcare, employment, housing, and personal development. The staff expressed a desire for matching categories to appear on the Shared Message Board as it would turn it into a resource to reinforce the areas they were explicitly working on with the residents.


The staff also wanted more in the way of scraped information from the web. During the first phase of the deployment the Shared Message Board displayed information from Georgia Housing Search, a targeted housing search website for low income and subsidized housing. Employment information was the next big category of information that seemed ripe for updating automatically each day, providing the residents with an up-to-date list of job offerings in the area.

As different generations of residents used the Community Resource Messenger during the first phase of deployment, they would all eventually lament the difficulty in finding which posts to the screen were new. Even though each post had a date next to it, the modest rate the messages scrolled by made it an extreme exercise in patience to wait for old messages to clear away for new content became visible. This factor did effect how the residents engaged with the Shared Message Board, particularly later in their stay at the shelter once they had seen much of what was displayed on the board and once their need for information became more specific.

The response to these two challenges took shape as a complete re-organization of the Shared Message Board to present finer-grained categories of information that mapped to some of those used during case work and counseling and the addition of a subscription service to the messaging infrastructure that would forward messages from selected categories to residents phones.

Figure 27 shows the design of the Shared Message Board during both phases of the deployment. The redesign was focused on four main areas (from left to right, following the numbers in the figure):

1. Up to six categories of content are available down the left-most column of the screen: Announcements, Collage, Employment, Local Events, Health & Wellness, and Housing. Staff would categorize messages they posted to any of the categories with the default category set to Announcements. The Employment and Housing categories included messages posted from the staff as well as scraped




Atlanta Community Resources

3780 Job search and training site: The Samaritan House Employment Readiness Program 404.523.1239 (phone) The EDGE (Earning Dignity, Gaining Employment) provides comprehensive daytime support services to homeless men and women in our community who are seeking employment. - 02-12-2010

6104 Apply for TANF (cash assistance), Subsidized Child Care, Food Stamps and/or Medicaid at the local DFCS office. Applications available in the staff office submit applications at 170 S. Peachtree walking distance

Current Topics: *safety shelter food*

To have a message sent to your phone, text the adjacent 4-digit code to 678-992-9429



Atlanta Community Resources

1 Announcements

Collage


Employment

Health & Wellness

Housing

To receive the message on your phone or email, text the 4-digit code to: **404 954 1393**

Press the knob to change categories. Turn the knob to change scrolling speed.



2 Messages from the Staff

4234 For those of you who are moving into their own apartments, Partnership For Community Action Inc. maybe able to assist with utility bills if your income is below a certain amount. Please see flyer posted on the board in the hallway. - Nov 12

8269 Winston Manor Apts., located at 2520 Candler Road, have 2-bedroom apartments starting at \$499 and 3-bedroom starting at \$599. Call 1-866-375-3573 ex.4930 - Feb 03


8998 Columbia Residential is accepting pre-applications for apartment units receiving rental assistance at The Retreat at Edgewood. Eligible residents will pay no more than 30% of their adjusted monthly income for rent. Open Date: April 4, 2011 at 10:00 AM. Close Date: April 6, 2011 at 2:00 PM. See Sybil for more details! - 3 weeks ago

8947 \$500 - \$600 Not Income Based, Sierra Ridge 3020 Delmar Lane, Atlanta GA 30311, (Apartments) MPML, Inc 770-529-1052 (2913)

8947 \$500 - \$600 Not Income Based, Sierra Ridge 3020 Delmar Lane, Atlanta GA 30311, (Apartments) MPML, Inc 770-529-1052 (2913)

9172 \$500 - \$535 Not Income Based, The Park at Greenbriar

3 Map



4 Settings

Turn High BP, Low BP

Turn High BP, Low BP

Figure 27: Shared Message Board design in phase I (top) and phase II (bottom)

content from the web. Messages from residents (via SMS or MMS) would be added to the Collage category. The Shared Message Board automatically cycled through the categories, spending 60 seconds in each before moving on. A user could manually change categories using a PowerMate (a large aluminium knob) that was installed below the screen.

2. Messages in the displayed category scroll from bottom to top in the left-half of the content area. The scrolling in the second version of the Shared Message Board was controlled via the attached PowerMate, and enabled residents to slow the scroll rate to a near stop or make it move more quickly to advance past old or familiar content. The 4-digit codes to the left of each message were used as a shortcut for residents to receive the associated message on their phone: sending an SMS with the 4-digit code to the Community Resource Messenger would generate a response with the content of the associated message (or, in the case of employment messages, a link to the full job listing). The 4-digit code was a quick way to pull information like phone numbers and addresses from the Shared Message Board.
3. In the right-half of the content area, the Shared Message Board displayed either an image sympathetic to the content (*e.g.*, of the neighborhood center for Local Events), or was integrated with Google Maps for messages in the Employment and Housing categories. The Housing map placed markers for each of the listings currently being displayed by the Shared Message Board. Listings that were visible were highlighted on the map and the markers had matching 4-digit codes to aid matching description to location. Employment information was not as specific and was presented by highlighting larger areas where the job was listed (*e.g.*, North Atlanta, Smyrna, Norcross, etc.).

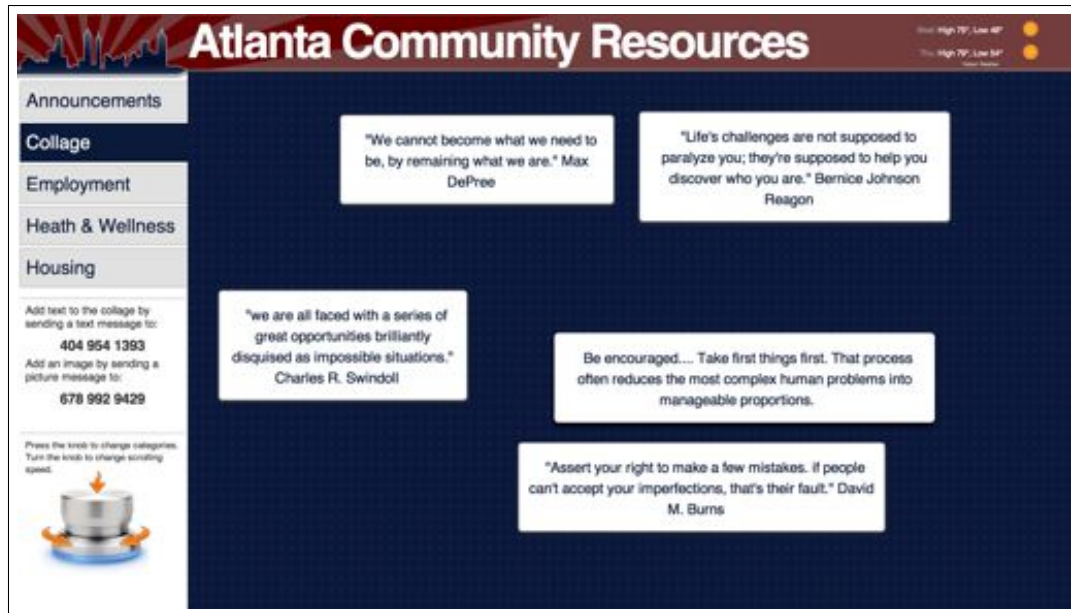


Figure 28: Collage category in the Shared Message Board

4. Finally, weather information was provided in the top right. The residents did not typically have access to news while at the shelter but they wanted basic information to help them plan ahead before leaving the shelter each morning. Weather information was a frequent request from the residents and was a straight-forward addition to the Shared Message Board.

The Collage category was a special category for content from the residents. In the first phase of the deployment, the Shared Message Board would display residents' content in the same list format as content from the staff. This led to somewhat limited and very on-task sharing of information via the Shared Message Board: residents would post job opportunities, or housing listings they came across, or messages about specific shelter issues (such as chores). The residents did not invest in developing more experiential messages aimed at their fellow residents and this was something I wanted to explore with the redesign of the Shared Message Board.

I designed the Collage as a place on the Shared Message Board where residents could share informal knowledge and develop interactions around the more social aspects of living in the shelter. In the Collage, text and photos sent via SMS and MMS

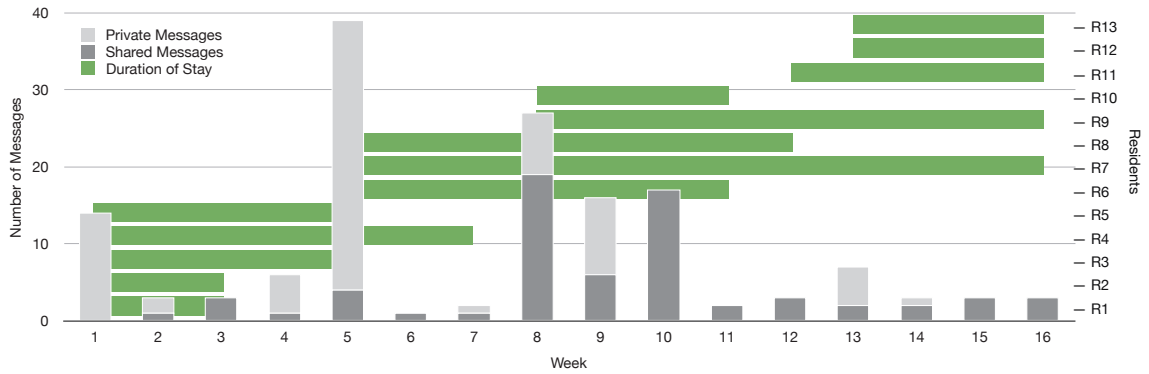


Figure 29: Phase 2 system usage pattern

were placed in a random and potentially overlapping manner (see Figure 28). The intent behind the change was that a less formal presentation of the content would entice more casual engagement and break down the perception that only information similar to that posted by the staff was appropriate for the Shared Message Board. The change was an attempt at bringing together two different forms of knowing about the world, one tied to the services and resources of helping the residents establish stability, the other about expressing the experiences and the tacit knowledge of managing homelessness on a day-to-day basis.

9.4.2 Patterns of Use

As with the first phase of the deployment, examining the usage data during the second phase provides a basis upon which to begin to unpack the way staff and residents engaged with the Community Resource Messenger. As noted earlier, the second phase of the deployment had different characteristics from the first phase: it only lasted 16 weeks and the semiweekly meetings were not explicitly structured as part of active design discussion but were instead framed as reflections on how the Shared Message Board was encountered by the residents, and the different visibilities of information via the board and via the direct messages sent between the staff and residents.

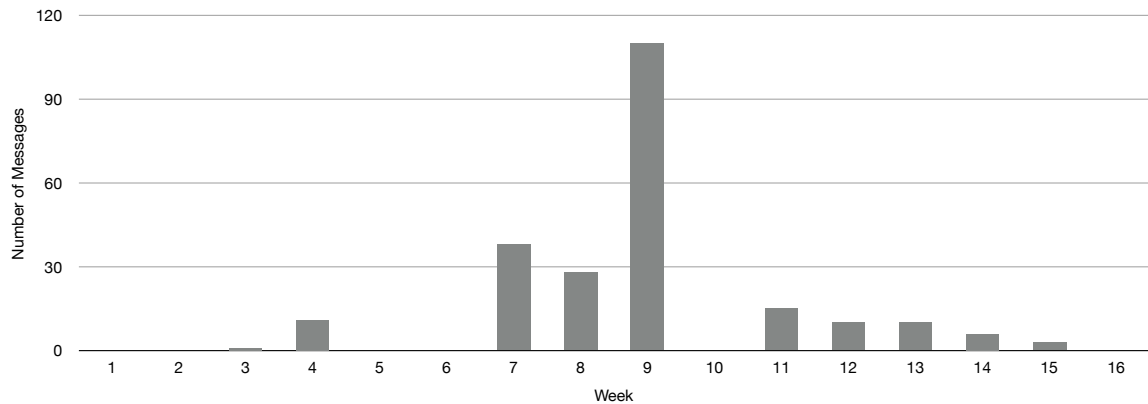


Figure 30: Messages sent from the subscription service

Turning to the same representation of system usage and resident stay used for the first phase of the deployment, Figure 29 layers the volume of messages sent over the generations of residents present during the 16 weeks of study. The first point to note is that the cycle of low initial use progressing to increased use prior to exiting the shelter is present, but not as pronounced as it was during the first phase. Weeks 2–5, and 6–10 have similar characteristics but weeks 11–16 do not share the same pattern despite the resident turnover that occurred around week 13.¹ One of the more striking differences is the absence of direct private messaging in seven of the 16 weeks. During the second phase of the deployment there was a shift toward more messages being sent to the Shared Message Board, rather than individually to residents—this shift was the result of the subscription service. The staff set up subscriptions to categories of interest with the residents and then instead of crafting messages tied to specific individuals or groups of individuals as they had in the first phase of the deployment, the staff would post more messages to the Shared Message Board, allowing the subscription service to handle delivering those messages to the residents’ mobile phones.

¹The spike in private messages in week 5 was the result of a snow storm that crippled Atlanta for a solid week. The main staff were unable to get to the shelter and used the system to update the residents on school closures and logistical details as they worked to keep the shelter running while the city was paralyzed from ice and snow.

Figure 30 shows this phenomenon through the number of messages sent via the subscription service. In the 3rd and 4th weeks, the staff began using subscriptions in a limited way. By week seven, all of the residents had been subscribed to at least one category of Shared Message Board messages and were receiving messages as they were added to the Shared Message Board. The peak in subscription based messages occurred in week nine as the case manager re-activated the accounts of prior residents and used subscriptions as a way to easily send message out to individuals who had recently been at the shelter. The dip in week 10 came as the the case manager and program manager renegotiated when and how to contact prior residents (much as had happened in the first phase of the deployment around boundaries of when and how to confront current residents about shelter rules). By week 11 a balance was found and the remaining weeks saw a lower number of subscription based messages go out.

The major shift during the second phase of the deployment is that the subscription service created an incentive for the staff to focus on the Shared Message Board as the target for new information rather than on sending out individual messages to the residents as they had during the first phase of the deployment. The private messages sent during the first weeks of the second phase were universally about the services and resources the residents needed—the instrumental messaging seen through both phases of the deployment. By week 10 the subscription service had supplanted those personal messages and the private messages in weeks 13 and 14 were the only instance of social or relationship based messages seen during these 16 weeks (the case worker sent a message to several residents to “Have a wonderful week” to which some residents responded in similar fashion).

This shift was important because it was a move away from the social support that lay at the center of the usage pattern seen in the first phase of the deployment. Instead of developing a relationship directly with the residents via the Community Resource Messenger, the staff shifted to more of a distribution model of getting information

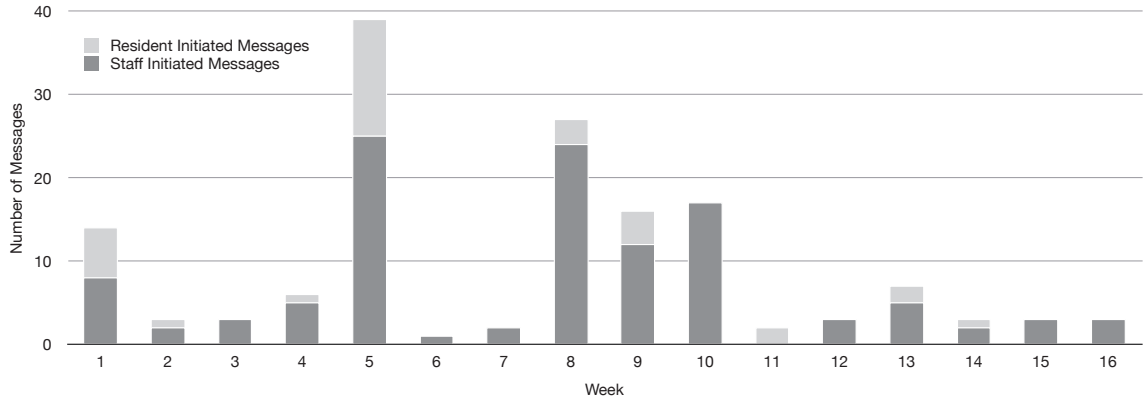


Figure 31: Phase 2 message origin, staff versus residents

out without the same level of rapport observed earlier. Furthermore, the shift was a byproduct of the new subscription services as it was simply easier to create one message that would land in several places than it was to generate individual messages to each resident.

Another consequence of the shift toward communicating with the residents via the subscription services was a marked decrease in the number of messages sent by residents. In the second phase of the deployment, the staff sent 79.6% of all messages and the residents 20.4%, and the standard deviation was again high at $\pm 25.6\%$. This is a significant change in the dynamic of use from the first phase where participation was more evenly split between staff and residents. Here again, I point to the subscription service and how its presence changed the legibility of the Community Resource Messenger from a system built around individual and personalized communication between the staff and residents, to a system supporting the broadcast of information from staff to residents.

9.4.3 Experiential Data

Through the interviews and observations I conducted during the second phase of the deployment, I was able to compliment the insight garnered from analyzing the usage data of the system. The changes to the Community Resource Messenger impacted

how the staff communicated with the residents but also how the residents perceived the technology and the ways they could and should interact with it. The structure of the second phase of the study also impacted how the residents thought of the Community Resource Messenger, illustrating that design based interactions are a critical component to the infrastructuring necessary to constitute a public through the invitation to a kind of critical engagement and imagining of futures beyond the present modes of use and interaction.

9.4.4 The Shared Message Board

The first point to make is that the redesign of the Shared Message Board had an immediate impact on the residents of the shelter. The first five residents involved in the second phase of the deployment had experience with the previous design of the Shared Message Board—between deployment phases, the Community Resource Messenger remained in use, though residents were not recruited as part of the study during that time—and were specifically asked to discuss the differences between the two designs.

One of the first responses to the redesign was that it looked more complete and “professional.” The availability of more extensive employment information, and the integration of Google Maps to show where jobs and housing opportunities were located was immediately pointed to as a useful improvement: one resident noted that she knew certain parts of town were not very safe and the housing map helped her identify which houses and apartments she should seek or avoid. The addition of multiple categories of content was also welcome as it reduced the total number of messages in any one category and made it easier to notice new messages and to reduce the overall time spent in front of the screen looking for desired information.

As the weeks moved on and the next generation of residents came in contact with the Shared Message Board—and it needs to be pointed out that the Shared Message

Board was the most visible way the residents encountered the Community Resource Messenger—their perception of the system tended to turn on the “professional” appearance of the Shared Message Board. The information design did not look like something open to the residents. It was viewed as a nice and effective way for the staff to post information, but not as a shared space for both residents and staff to intermingle their knowledge and experience.

This perception turns on the dynamics of the legibility of the Shared Message Board and the legitimacy of participation with the technology. In the earlier version, the Shared Message Board was a little less polished, a little less complete, and those rough edges were part of an invitation to try the technology and helped develop a sense of legitimate ownership in shaping what took place on screen. The lack of extensive categories in the first version and the plain appearance of text did not overly suggest specific uses, so the residents could and did develop a sense of ownership during their stay at the shelter. It was a part of how they communicated with each other and developed a shared identity.

The redesign had a much stronger visual design with clear categories and clearly different ways of organizing information in those categories: some content was associated with a map, some presented as text only but complimented with an evocative photo, and the Collage category that was to be the open space for the residents to fill looked completely different. These differences constrained the perception of the Shared Message Board both as a more finished product—where it was a work in progress during the first phase—and as the domain of the staff.

During both phases of the deployment I would ask the residents about using the Shared Message Board to post information they thought would be useful to others in the shelter. During the first phase this was sometimes met with surprise—“you mean we can post anything we want?”—but that surprise gave way to some modest engagement with posting information. In the second phase, the same question was met

with skepticism and only one resident posted messages to the Shared Message Board (both about a job fair happening the next day). Another resident commented that she was not sure what she had to offer that the staff were not already providing—this comment going back to the perception that the Shared Message Board was a tool for the staff and not for the residents.

Another facet of how the Shared Message Board was legible to the residents is connected to the choice I made in presenting their information as a collage and inviting them to share photos on the Shared Message Board. The collage format was meant to suggest informal and open-ended use and the sharing of photos was meant to compliment that by providing a means of engaging with fellow residents through more social channels. In hindsight, this was doomed to fail, and did fail for two main reasons. First, the mothers at the shelter had little in common and little reason to share so openly with each other. Certainly the creation of a social bond, and the constitution of a public around shared issues occurred during the first phase of the deployment, but it was around issues of the *shelter*, not elements of their *private lives*. Second, photos can be a more intimate and identifying item to share—certainly more so than sharing information or experiences via text. This difference seemed to be a disincentive to share, one tied to the perception that the Shared Message Board was for information about services and not about creating a record of shelter life.

9.4.4.1 Design's Role in Constituting Publics

The second significant difference between the first and second phases of the deployment was the way the residents coalesced into a public via the Community Resource Messenger. As I pointed out earlier in this chapter, the system did support the creation of publics with the residents during the first phase of the deployment. The Shared Message Board played an important role in constituting a public by mediating the expression of common issues, but the study design also contributed to the

constitution of the residents' public through by creating a dialog around the ongoing design of the Community Resource Messenger—a dialog that I intentionally did not engage in during the second phase of the deployment.

The interviews I conducted with the residents during the second phase of the deployment focused on their use of technology and the communication they were having with the staff. Their responses brought up issues about the information they were receiving, the kinds of things they needed more of (information about childcare being a consistently important topic across each generation of residents during the second phase of the deployment), and their impressions of the level of communication—was it too much? Was it coming at useful times? Were they responding and asking questions of the staff? Their responses were positive, the information was useful and timely, but the messaging practices were not developing into back-and-forth exchanges as the usage data above show.

While the interviews shed light on what parts of the technology were helpful, they did not engage the residents in a more critical process of imagining what the Community Resource Messenger might do beyond its present functionality—there was little in the way of infrastructuring. The features were taken as given and final, the presentation of the Shared Message Board reinforced this, and the residents' responses were focused on the kinds of information they were receiving, but not about how they could participate in generating information. This was a difference from the first phase of the deployment where the residents would come to a point in their stay and their interaction with the Community Resource Messenger where they would begin to engage with what the technology might do and what they might do with it via a discussion of the system as an evolving artifact that they were empowered to change and evolve based on their experiences at the shelter and with the system.

With respect to constituting publics, the difference between the first and second phases of the deployment illustrates the role of design in creating a social space for

identifying issues and engaging in developing responses to those issues—the kind of infrastructuring work that sustains a public across a dynamic set of issues. In the second phase of the deployment, this element was missing in the structure of the interviews and interactions I had with the residents, the system was taken as final and only the content that was provided via the system seen as something they could legitimately comment on.

9.5 Impact of the Deployment

The last analysis I conducted on the Community Resource Messenger was to understand the impact of the system for the residents at the shelter. To do this I administered a survey instrument called the Family Support Scale (FSS) to residents at the beginning and end of their stay at the shelter during both phases of the deployment. The FSS measured the qualitative experience of different sources of family support and was used to assess how connected each resident was to different forms of support prior to and then after their stay at the shelter (see Chapter 3 for more details about the FSS and Appendix A for a copy of the survey). By looking at the pre and post survey scores, I had a measure of change resulting from the time spent at the shelter. I then correlated that change with usage of the Community Resource Messenger (using total messages sent as the measure of use). My hope was that a correlation would suggest whether the Community Resource Messenger became a resource for the residents as they connected to the institutions and services they needed to regain stability in their lives.

While every resident in the study filled out the first survey, the return rate on the exit survey was 16 (42%). The lower return rate reflected the challenges working with this kind of population. In several instances, residents left abruptly and unannounced, in others housing options became available quickly and they had to move immediately. To mitigate this, I tried to catch residents within the last week of their stay or

visited them at their new place of residence after leaving the shelter. Despite the absolute return rate on the post-stay survey being low, it does represent the range of experiences at the shelter: residents who used the system both heavily and lightly are represented in the sample, as are those who were at the shelter for both extended and brief periods.

As presented in Chapter 3, I ran two methods of analysis on the FSS data. First, I used a Wilcoxon Signed Rank test to determine the significance of the change between the pre/post survey scores. My analysis found $W=16$ ($0.005 < p < 0.01$) which indicates the change in FSS score was significant. This change was a reported average increase from pre to post of 4.34 points in the total FSS score across both phases of the deployment—indicating the residents were becoming more connected to social support. Singling out each phase, I found that the average change for phase one was 8.46 and the average change for phase two was -3.44. The overall result is not surprising: the expectation is that as the residents work with the staff at the shelter they become connected to a range of different services and institutions and gain the support they need to reach out and find help. The fact that this was not the case during the second phase of the deployment is a little worrying—the residents during that time were not having the same success with connecting to social support as residents during the earlier period of the deployment.

The second analysis I carried out on the FSS data was to calculate Spearman's ρ to assess the correlation between the change in FSS score and level of usage of the Community Resource Messenger. The results of this analysis found $\rho=0.24457$ ($p=0.035$). This result does not indicate anything useful, although there is a very weak positive correlation between the positive change in FSS score and system use. Digging a big deeper, however, and separating the analysis between the first and second phases of the deployment, I found that for the first phase of the deployment $\rho=0.64058$ ($p=0.371$), while the second phase of the deployment $\rho=-0.32142$ ($p=0.078$). This

tells us that there were serious differences between the first and second parts of the deployment: the first phase showed a stronger correlation between the change in FSS score and system use—though one that did not have a terribly strong statistical significance; the second phase showed a much weaker correlation.

The results of the Spearman's ρ analysis are not overwhelming, but they do shed a bit more light on the differences between the first and second phases of the deployment. The first phase of the deployment was marked by much more pervasive engagement in private messaging between staff and residents, and the correlation between this measure of system use and positive outcomes with respect to establishing connections to social support was good (if weak). In the second phase, the model of usage was much less a social connection between staff and resident, and the residents during that time were not making the same kinds of support connections that the residents during the first phase of the deployment were.

The take away from this analysis is that for residents engaged in establishing social support, the Community Resource Messenger became one of the tools used to create those connections. During the first phase of the deployment this included, and was amplified by, the connections the staff and residents established via the Community Resource Messenger. In the second phase of the deployment, the mode of use did not include direct messaging to any meaningful degree and so the Community Resource Messenger was not the same kind of resource to the residents at the shelter during that time.

CHAPTER 10

REFLECTIONS

When I set out to design the Community Resource Messenger with the staff and residents of the shelter, I had an explicit goal of catalyzing and supporting two unique but interconnected publics. For the staff, I sought to support the action they were taking as they confronted issues that had already bound them together as a public; for the residents, whose membership was under constant change, I sought to create a platform for exposing and articulating common issues so that they could begin to develop a shared sense of identity as a public and move to take collective action to confront the issues facing them.

An important goal of this effort to design for two publics was to design the system so that it would sustain each public over time and not just be an artifact of the specific and limited conditions under which it was designed. During the first phase of the deployment, there was evidence of the integration of the Community Resource Messenger into shelter life across multiple generations of shelter residents—residents who had no part in the initial system design—and of achieving some success in constituting and sustaining publics over the course of the first 30 weeks of use.

This success, however, took different forms. Whether through facilitating a redrawing of boundaries between staff and residents, or by being enlisted in the construction of shared identity, or in waking dormant tensions among the staff, use of the Community Resource Messenger was shaped by the social dynamics at the shelter—the staff and residents chose to use the Community Resource Messenger in particular ways, and those choices had subsequent consequences on shelter life. In particular, the destabilization and subsequent renegotiation of roles that arose among the staff

was consistent with Dewey's notion of publics as mutable entities. The attachments the staff had to issues of boundaries and of effective means of communicating with the residents evolved as a result of having new modes of conducting that communication. The latent tensions between the program director and case manager surfaced as a result of these evolving attachments and created a situation where use of the Community Resource Messenger had to be negotiated around the broader issues of how the staff would develop their relationships with the residents and maintain rules and routines of the shelter.

This capability to express and respond to different issues did not come from a specific desire to disrupt power dynamics at the shelter. On the contrary, it arose from a commitment on my part, as system co-designer, to provide appropriable tools to the staff and residents so that they could resolve issues as each saw fit. As use of the Community Resource Messenger developed, new strategies for confronting common issues also developed, and in the case of the staff, that use disrupted established power dynamics. The subtle point here is that the tension experienced by the staff was not one of staff versus staff or of staff versus technology, but one of evolving attachments to the issues of how they managed relationships within the shelter as facilitated by the Community Resource Messenger.

This kind of exploration of attachments has parallels with systems like UrbanSim or Water Wars that focus on making explicit the commitments of various stakeholders (Borning et al., 2005; Hirsch, 2010). However, unlike those systems, the Community Resource Messenger enabled immediate action to be taken on the issues expressed via the system. The staff and residents could work separately or together to resolve the issues they faced. The action precipitated by using the Community Resource Messenger was specific to the homeless care community where technologies are more often deployed as procedural resources for enabling oversight and accountability (Bovens &

Zourdis, 2002; Kling, 1978). The support provided by the Community Resource Messenger, in contrast, came by way of amplifying the relationships among the staff and residents rather than by attempting to bypass those relationships with a rationalized system for managing constrained resources. I would argue that one of the main reasons the residents in particular did not view the Community Resource Messenger as a burden was that their experience with the system was social rather than procedural; it facilitated their relationships with staff and it provided a way to further establish and share in their relationships with each other. The result of supporting the staff and residents by way of their relationships was that the Community Resource Messenger became a socio-technical resource for the shelter: a stable medium for sharing information that helped the staff be more effective and helped the residents feel more connected, while providing the degrees of freedom necessary to foster and sustain a number of unique relationships within the shelter.

During the second phase of the deployment, the changes to the system impacted how the residents engaged with the different modes of communicating available in the Community Resource Messenger. As a result, the degree to which they created a sense of shared identity and developed the kind of social interaction present in the first phase of the deployment was impacted. The most immediate consequence of this change was a difference in how the residents in the second phase of the deployment reported becoming connected to social support—the first phase of the deployment saw marked increase, the second phase saw an overall negative change as measured by the FSS. This difference comes as the absolute number of messages being sent to residents increased via the subscription service while the back-and-forth conversations about that information decreased: during the first phase of the deployment, each resident received an average of 5.7 messages and sent an average of 4.9 messages; in the second phase of the deployment, each resident received an average of 22 messages and sent an average of 2.8 messages. This is a large difference with respect to the creation of

a conversation between staff and residents. Coupled with the negative change in the FSS scores during the second phase of the deployment, these figures support the claim that socially mediated and supported access to information was more important for the residents at the shelter than simply increasing access to information.

Another difference with the second phase of the deployment was a lack of engagement around sharing information via the Shared Message Board. During the first phase of the deployment this kind of public sharing was not frequent, but it did occur throughout the deployment across several generations of residents. Moreover, when it happened, the shared messages had the effect of coalescing identity and action by way of the issues being expressed on the Shared Message Board. This kind of use was completely absent during the second phase of the deployment which was disappointing because the changes to the Shared Message Board were made principally to create more explicit space for the residents to share experiences via the board.

I outlined some of the reasons the residents in the second phase of the deployment did not use the Shared Message Board: the inclusion of sharing photos was too personal for the prominent location of the board and the Shared Message Board was perceived as a space owned by the staff. There was also the shift in the way the technology was introduced to the residents. Instead of carefully setting up the experience as one of on-going design, the residents in the second phase were asked to reflect on their use of the system and the messages and information they received from it. Each of these differences begin to unpack the role of legibility, literacy, and legitimacy in how the residents responded to, used, and integrated the Community Resource Messenger into their lives. It also points toward the role design has for framing the social context around exploring future outcomes and looking for ways to shape those outcomes. All of these elements tie into the constitution of publics and the kind of work necessary for creating the kinds of socio-technical resources necessary for supporting publics.

10.1 Legibility, Literacy, Legitimacy, Design, & the Formation of Publics

At this point I will return to my research framing of understanding how the legibility of a technology, the literacy of the urban homeless, and the different modes of legitimate participation impact how the homeless use mobile technologies and inform the constitution of publics. These different aspects of the social context are coupled and create different feedback loops: a Deweyan public is both a site for understanding issues of legibility, literacy, and legitimacy and a social construct whose constitution is shaped or impeded by those same dynamics. Aside from exploring the impact of different functional features in the Community Resource Messenger, the two phases of the deployment created the necessary condition of contrasts to demonstrate how publics form and how legibility, literacy, and legitimacy are implicated in that formation.

I would make a careful qualification here that aside from the changes to the Community Resource Messenger between the first and second phases of the deployment, there were many aspects of shelter life that I did not have control over and which could have affected the uptake and use of the technology. The personalities of the residents and the specific needs they might be dealing with had a significant impact on system use even during the first phase of the deployment: some of the residents were doing their best to be positive and helpful to each other which created a more nurturing environment, other residents were angry and had curious senses of entitlement that precluded them from engaging constructively with the staff, each other, and the technology. Throughout the discussion below I have built in a calibration of these factors based on my extensive time at the shelter.

10.1.1 Legibility of the Community Resource Messenger

The legibility of the Community Resource Messenger changed over the course of the two phases of the deployment. As I discussed in the previous chapter, during the first phase of the deployment, the residents interacted with a system that looked, by way of the Shared Message Board, unfinished. The display of information was simple and the lack of fine-grained categories of information left more room to reinterpret the space through resident-created content. By the second phase of the deployment, this visible aspect of the system had changed considerably. There were more categories and the information presentation was more thoroughly executed with maps and visual elements to compliment the text posted to the Shared Message Board.

During the first phase of the deployment, shelter residents began to interpret the Community Resource Messenger as something they could take ownership of by expressing their knowledge and experience rather than simply as another outlet for information consumption. One way this occurred was through the Shared Message Board where residents expressed positions on day-to-day issues at the shelter. The event that arose from some residents falling behind in their chores, and another resident using the Shared Message Board to remind the women of their shared responsibilities, is an example of this mode of engagement. This interpretation of the technology was an important one for the residents as it marked a move not only of taking ownership of their experience with the technology, but also of recognizing their (temporary) shared identity and using that to self-organize in a new and constructive way. The event, though catalyzed by the mundane issue of completing chores, catalyzed the expression of shared issues, a subsequent discussion about how to address those issues, and finally action taken by the residents to reach a desired outcome. It was, in short, the constitution of a public that was mediated and then supported by use of Community Resource Messenger and the ability to publicly express issues facing the residents.

The novelty of this event should not be discounted. When the message first appeared on the Shared Message Board, the staff were inclined to remove it because it was confrontational and not something the staff had previously seen occur in such a public way. After consulting with me, the staff decided to leave the message on the Shared Message Board but address it in their regular group meetings with the residents. It was during those meetings and in the subsequent days at the shelter that the residents came to manage the issue among themselves, resolving internal disagreements and establishing boundaries of their own to ensure the common chores were completed. The point to note here is that the legibility of the Shared Message Board as a mutable space available for the residents was critical to enabling this exchange to take place. It was not just that the Shared Message Board was visible to everyone in the shelter, it was also that the residents perceived it as an appropriate place for expressing certain issues facing them.

During the second phase of the deployment, the legibility of the Shared Message Board had changed—it appeared more fixed in purpose and residents did not view it as a place for their experience so much as a broadcast channel for information from the staff. On one hand, the information design changes to the Shared Message Board resulted in a richer information for the residents—an improvement remarked upon by several women throughout the second phase of the deployment. However, the trade-off was that it limited the perceived purpose of the Shared Message Board. Through my interviews and discussions with the residents, the notion that the Shared Message Board was available for their use never took hold—despite repeated prompts to understand why they did not share information via the Shared Message Board, or post photos to the collage. By the second phase of the deployment, the design of the Shared Message Board more clearly communicated its purpose, and that purpose was as a place of information consumption, not of production.

The change in the legibility of the Community Resource Messenger extended to the staff as well. In the first phase of the deployment, the staff read the Community Resource Messenger as a system for communicating with their residents. The majority of the messages were individual communications around the specific needs of each resident. In fact, this individual communication was an important new dynamic within the shelter: prior to the existence of the Community Resource Messenger, all staff-resident communication was done face-to-face. By moving some of the social interactions into a technology mediated space, the residents had more dynamic access to information from the staff—*e.g.*, by receiving information while away from the shelter—but more importantly, they also gained an ability to manage their responses to that information. By having information sent to their mobile phones the residents could now make a decision about what information to act on and what to ignore without direct confrontation with their case worker. This change impacted how the staff approached conflict with the residents and how they negotiated confrontation among themselves: where individual messages about resources, services, and coordination were deemed appropriate, messages that dealt with shelter rules were not.

By the second phase of the deployment, the subscription service had changed much of what the staff were doing with the Community Resource Messenger. The apparent ease of subscribing residents to categories of interest became a shortcut for ensuring information was being sent to those who needed it—and this was as designed. What I did not foresee was the concomitant shift from personal messaging to simple broadcast of information that was not individualized. Again, the legibility of the system changed, from one built for personal communication between staff and resident, to one built around information broadcast. The first led to conversations between staff and residents, micro-coordination about services and appointments, and a more expressive rapport as the system mediated staff and residents working together to achieve

specific outcomes. The second did not lead to conversations between staff and residents, and as a result, did not support building rapport and the micro-coordination that marked the first phase of the deployment.

The change in how the staff used the Community Resource Messenger only reinforced the change in legibility imparted by the more visible changes with the Shared Message Board. The overall experience became one of information broadcast rather than one of information exchange. Where this had the most significant impact was in how the Community Resource Messenger was recognized and marshaled as a resource for the residents to share with each other, articulate common issues, and create an atmosphere where those issues could be addressed. Where the Community Resource Messenger became a socio-technical resource for the residents to constitute a public in the first phase of the deployment, no such dynamic took hold during the second phase.

10.1.2 Literacy in the Urban Network

The effect of literacy on the adoption of the Community Resource Messenger followed similar contours of change from the first to second phases of the deployment. For the staff, the Community Resource Messenger was in many ways more disruptive and prompted both a reconfiguring of the work the staff did as well as renegotiation of how the staff related to the residents (as pointed out above). This reconfiguration, particularly during the first first phase of the deployment turns on moving to support the literacies of the residents in different ways.

During the first phase of the deployment, the Community Resource Messenger presented a new challenge for the shelter staff on two fronts. The first was that it resulted in some reconfiguration of work responsibilities as the staff organized around who was most comfortable using the technology, and who had the best access to up-to-date information. The second challenge arose from a more systemic shift in

how the staff related to the residents. By posting information to the Shared Message Board or sending it directly to residents, the shelter staff were no longer case-by-case gatekeepers to information the way they had been. For example, information about housing programs or job opportunities were made available to everyone in the shelter via the different communication channels of the Community Resource Messenger. In some cases, the Shared Message Board meant anyone had access to the information, in others, the information was sent out individually. The major difference was that previously, such information was doled out much more selectively and less frequently through in-person interactions with the program manager, but as the staff integrated the Community Resource Messenger into their routines it helped them make information more widely available (through the Shared Message Board) and more temporally relevant (through individual messages sent to residents' phones). As a result, the residents were arguably more empowered to make decisions for themselves, resulting in a change to the kind of dependency they had on the shelter staff—something that some staff supported while others approached with more skepticism.

Amplifying the tension among the staff around how and when to share information was the fact that the new work created by the Community Resource Messenger was largely taken on by a junior case worker who, through her sharing messages with the residents, became a much more central actor for the residents. In effect, this shift changed the face of the staff public from one established on a more authoritarian application of rules and routine from the program director, to one that developed from building individual rapport with residents as a confidant and advocate. The differences in approach, of adhering to well defined boundaries and procedures for sharing information versus a more fluid set of boundaries and a willingness to give residents more responsibility earlier in their stay, were always present but were examined anew

when adoption of the Community Resource Messenger changed the dynamic at the shelter during the first phase of the deployment.

The new forms of communication that took place during the first phase of the deployment were empowering for the residents in part because they provided more access to timely information, but also because they aligned with the kinds of literacy present among the residents (Alexander et al., 2005; Beegle, 2003; Hersberger, 2005): the preference for personal communication, for building relationships, and developing a confidant to help manage their situation were all part of these new modes of communication engaged in via the Community Resource Messenger. The use of SMS was an important part of supporting this literacy because the residents had used SMS frequently and for social interactions, which reinforced that communication channel as one through which to build relationships (*i.e.*, SMS was specifically legible as a means of supporting social relationships). By amplifying the personal connection between the staff and the residents, the system created a new way for the two to identify specific issues and coordinate action—and to do so in the moment, during the day when this kind of support and interaction.

During the second phase of the deployment, these modes of interacting via the Community Resource Messenger had changed. The staff were using the system to broadcast information rather than engage in discourse with the residents about the services they needed. This resulted in a mismatch between the literacies of the residents, which tended toward personal relationships as a mediator to information and services, and that of the staff, which had shifted to information distribution. In short, the Community Resource Messenger ceased to be about amplifying the relationship between the staff and residents and became another means of broadcasting information—a one-way interaction. This in turn had a direct effect on how the staff and residents built rapport in that the times and places rapport could develop were

again limited to the in-person time at the shelter since the back-and-forth conversations and social messaging that extended those periods of contact during the first phase of the deployment were no longer occurring in the second phase of the deployment.

10.1.3 Legitimacy and Participation

The role of legitimacy was expressed across the two phases of the deployment most directly through impressions of ownership—shaping who had legitimate claim to determining the use and experience of the Community Resource Messenger as a whole and in the Shared Message Board in particular. As with legibility and literacy, there were changes in how perceptions of legitimate use precipitated use in the two phases of the deployment. These changes, I would argue, had stronger ties to the constitution of publics within the shelter because the absence of legitimate claims to co-opt a technology for particular use undermines the adoption of that technology to identify and articulate issues facing a given public.

Ownership for both the staff and the residents played an important role, particularly with respect to supporting the kind infrastructuring—the development of socio-technical resources to contend with future issues—necessary to sustain each as a public over time. For the staff, ownership was taken as given in that they ran the shelter and had access and authority to all parts of the shelter’s business. With the Community Resource Messenger this ownership was enacted through the way the staff used the technology to communicate with the residents, a use that evolved over the two phases of the deployment. Within the public of the staff, ownership and legitimate uses of the system was more dynamic. As I mentioned above, there were tensions between the staff in determining what were appropriate ways to use the Community Resource Messenger to work with the residents: using the system to

communicate around specific services and needs was clearly legitimate while communication around shelter rules was not legitimate according to the program manager.

There were also issues of who should legitimately be included in communication from the Community Resource Messenger. This issue started during the first phase of the deployment but became more pronounced during the second phase. At stake was which residents, current or former, should be included in system use. Again, the case manager, who was the most proactive user of the Community Resource Messenger, would use the system to reach out to residents who had recently moved on or with whom she had specific need to follow-up. The program director had a more rigid sense of boundaries in that once a resident had moved on, there were established channels for conducting followup and the staff should instead focus their time and energy on the current residents of the shelter. Part of this motivation was based on restricted resources: the program manager wanted to make sure the women at the shelter, who were in the midst of a housing crisis, had first access to any services or information from the staff. Former residents were already in housing or transition programs and the urgency of their situation was assumed to be less.

In the first phase of the deployment, the tension between legitimate uses of the Community Resource Messenger for contacting former residents centered on the more individual and personal messages between staff and resident—these were specific instances of the staff sending messages to follow up with a particular resident. In the second phase of the deployment the same issue took different shape as the staff began using the subscription service. The broadcast element of the subscription service

prompted the case worker to re-enable several accounts of former residents and subscribe them to specific categories of announcements.¹ This again prompted a renegotiation between the program director and case manager as they worked out who should legitimately be included as a recipient of the broadcast messages. The negotiation played out over the course of a week as the case manager would re-enable former residents' accounts, followed by the program director disabling those accounts, and back and forth until the program director finally established the ground rules.

Part of the tension between the case worker and the program director was one of ownership. The case worker was far more active in sending individual messages, the program director in updating the Shared Message Board. During the first phase of the deployment, the case worker felt she should own the relationships she had with the residents and if she needed to get in touch with them after they left the shelter, then that was her prerogative. During the second phase of the deployment, the case worker began handling more of the messages to the Shared Message Board (which were then passed on to residents' phones via the subscription service). Again, she felt this was part of how she was establishing a relationship with the residents and that she should own these decisions. The program director had different ideas of who "owned" the relationships and who should set the boundaries. Ultimately, these issues were resolved according to the program director's perspective: the resources and communication efforts of the staff should be focused on current residents and limited when reaching out to former residents.

Legitimate use of the Community Resource Messenger for the residents concerned the Shared Message Board and was tied very closely to the changing legibility of that component of the system from the first to the second phase of the deployment.

¹There was no facility for deleting user accounts from the Community Resource Messenger, instead, residents no longer at the shelter would have their accounts disabled. Disabling an account would remove that resident from the Message Center and prevent messages from being sent to their phone. Any resident's account could be re-enabled at any time.

When the residents used the Shared Message Board during the first phase of the deployment there was a clear realization of ownership—that they, the residents, could define legitimate use of the Shared Message Board through their use and actions. This resulted in situations like the one mentioned above where one residents used the space to address her fellow residents about completing chores, prompting discourse around the issue and action taken to mitigate it. The important shift was the moment the residents realized they could determine legitimate uses of the Shared Message Board, once that happened, the technology became a resource for the public as it mediated the articulation of issues and prompted the organization of action to mitigate those issues.

In the second phase of the deployment, this realization never occurred. The new legibility of the system, in particular the Shared Message Board, limited the perception of legitimate uses of the technology. Sharing experience and information were not the clearly legitimate uses of the Shared Message Board as the residents pointed to it as one of the staff’s primary mechanisms for communicating information out. The absence of legitimate claims to owning the space, the experience of the Shared Message Board impeded the formation of publics among the residents during the second phase of the deployment: they did not view the space as theirs to express their issues so those issues were not expressed in the highly visible, discourse-inducing way they were during the first phase of the deployment.

Legitimacy, in particular the way perceptions of legitimate use led to identifying with a kind of ownership, played an important role in the work of infrastructuring. When the residents recognized their use of the technology as legitimate it led them toward engaging in design for future use—creating speculative scenarios around what they might achieve via the technology. If they “owned” it, they could change it. Turning back to PD, there has long been a concern with different aspects of ownership in the design and development of artifacts and systems (*e.g.*, Balka, 2006;

Carstensen et al., 1999; Davis, 2009; Luke et al., 2004; Merkel et al., 2004). These concerns are particularly relevant in community-focused endeavors where ownership over the final product has been found to be critical for project sustainability (Carroll & Rosson, 2007; Merkel et al., 2004)—a point that is only supported through the different modes of use observed across the two deployment phases of the Community Resource Messenger. There is a distinction to make, however, in that the work that notions of ownership does for infrastructuring is not about the ownership of the material product itself so much as the ownership of shaping future attachments by way of a relationship to the material product. Viewed this way, the residents at the shelter had stronger notions of ownership of the Community Resource Messenger during the first phase of the deployment in that it was continually being re-imagined and its use reconfigured around shifting social boundaries. By the second phase of the deployment, as the notion of ownership and perceptions of legitimate right to co-opt the system eroded, the residents were inclined to accept the Community Resource Messenger at face value.

10.1.4 Infrastructuring Through Design

The legibility of the Community Resource Messenger, the literacy of the staff and residents' use of the system, and the evolving perceptions of legitimate use all impacted the formation of publics at the shelter. Arguably, the first phase of the deployment provided better support for constituting and supporting publics at the shelter. This was certainly true for the residents across both phases of the deployment. As I began to discuss above, a critical component to constituting and sustaining a public is supporting the act of infrastructuring, of developing a socio-technical resource that the staff and residents were empowered to use for their own ends. I contend that elements of the Community Resource Messenger's design directly impacted the way the system was perceived, used, and mediated the constitution of publics; however,

there was another factor during the research that was central to seeding the kind of infrastructuring work needed to constitute and sustain publics: participation in a design discourse.

Aside from the functional changes made to the Community Resource Messenger between the first and second phases of the deployment, there was a change in the setup of my interactions with the residents. During the first phase the residents were explicitly involved in co-designing the system: the interviews and group sessions were structured around a continued design discourse about what worked, what did not, and how would they, the residents, change the system. Through these interactions, the residents would begin to imagine different purposes for the information, or different ways of interacting with the system. In some cases, the changes were really those of co-option of what was already there—*i.e.*, realizing that the thing they wanted to accomplish was possible and that they had legitimate access to use the Community Resource Messenger in that way. In other cases, the changes they desired required functional changes. These desired functional changes were the basis for new and modified features included in the second phase of the deployment (*e.g.*, the subscription service and finer grained categories in the Shared Message Board).

During the second phase of the deployment, I wanted to focus on understanding the use of the Community Resource Messenger with respect to the new and modified features. The interviews and group sessions were not structured around open-ended co-design of the system, but around reflecting on how they were using the narrow set of features modified for the second phase. The engagement from the residents was just as thoughtful and critical, but it was not centered around generating new ways to use the system. The residents discussed the information they received and how useful and timely it was or was not; they pointed out the changes to the Shared Message Board as imminently useful and helpful in situating the information posted to the screen (specifically the employment and housing information that included mapped data);

and they discussed the messages received from the subscription service and how it helped them track down new information on the Shared Message Board. What they did not do was re-imagine how the Community Resource Messenger might play a role in other aspects of their lives at the shelter and in the relationships they had with each other or with the staff.

These differences point to design discourse as an important component of infrastructuring. It is not the structure that is specifically important, but the explicit opening up of future possibilities that develops engagement in imaging and supporting future use rather than accepting current use. One of the functions the design discourse provided was a hook to recognize different legitimate ways of perceiving and using the technology. In the case of working with the residents at my primary research site, the interactions structured around design led to the residents viewing their concerns and needs with respect to the Community Resource Messenger as legitimate (so that it was not just a system to support the staff), and their participation in the discussion as an important part of making it better for future users.

I would argue then, that constituting and supporting a public takes more than passing encounters with a mediating technology. It requires participation in determining the future use of that technology and the development of legitimate claims to shaping that future use. This is the act of infrastructuring and comes about as a result of the reconfigurations that occur around and with a technology intervention—the deployment of the technology is a beginning, not an end. It may serve as a catalyzing factor when constituting a public (as the Community Resource Messenger did with the residents during the first phase of the deployment), or it may be a factor that prompts a public to change its constitution (as happened with the staff throughout the deployment), but in both cases, the technological intervention is not to be understood as the culmination of a public’s formation. To wit, the Community Resource Messenger was constrained by the visibilities of different forms of communication.

In spite of these constraints, it also had many degrees of freedom with respect to how the staff and residents could reshape the technology for their own purposes. It was just this combination of different visibilities of information and the freedom to reconfigure responses to information that resulted in shifting of social boundaries and strategies for expressing self-determination and personal empowerment within the shelter during the first phase of the deployment. Those degrees of freedom were in fact increased in the second phase of the deployment, but the perception of being able to adopt and adapt the available modes of communication were reduced. The technology was a fixed artifact versus in a state of flux ultimately impeded the same kind of infrastructuring work from taking place.

By invoking “design” as a critical component to infrastructuring, articulating and responding to attachments to issues, I need to make it clear that it is the processual features of design that matter here, not the outcome. The second phase of the deployment was structured around a materially fixed artifact; the Community Resource Messenger was a product and as such was perceived as being less malleable to the evolving and dynamic attachments between the staff and residents at the shelter. And the system itself amplified and muted that dynamism in different ways. The participation—and the ownership—of the design ended when the product was completed, and the fundamental benefits of involving the staff and residents as co-designers rather than consumers was undermined (Sanders, 2005, 2006).

Based on the findings presented here, I contend that the theoretical perspective of Deweyan publics and the notion of infrastructuring provide useful insight into understanding the evolving power dynamics between the staff and residents at my primary research site; that the notion of publics provides scaffolding for designing for sustainability and mutability in socio-technical systems; and that publics reconfigure the PD process not as one that ends with a product, but instead one that initiates or shapes publics through on-going participation. Furthermore, within the framing of

publics there are the social and technical attributes of the legibility of the technology, the modes of literacy of those participating with and through the technology, and the evolving perceptions of legitimate modes of action. As I have labored to show here, each of these attributes is interconnected to the other and ultimately to the individuals and social site where participation is enacted.

CHAPTER 11

CONCLUSION

The research presented in this dissertation provides insight into the question: *To what degree do mobile technologies impact the urban homeless, impacting their ability to utilize social services and to interact as socially legitimate individuals within their immediate community?* My answer to this question came by way of a mixed-method approach to research that integrated empirical investigations of how the urban homeless and their care providers perceive and use different technologies, a theoretical investigation to put into practice the notion of Deweyan publics as a frame for system design and analysis, and a participatory design investigation and system deployment to establish an empirical basis for understanding the multiple ways a mobile and social computing platform impacted the routines and relationships at my primary research site.

Three main areas of interest shaped my investigation of current technology practices among the homeless and their care providers. These three areas cleft along axes developed by Brewer & Dourish (2008) as legibility, literacy, and legitimacy. Considering issues of legibility led me to identify the mobile phone as singularly important form of technology because it connected the homeless to social and institutional support networks, it was immediately recognized by the homeless as having direct impact on their lives, and it played an important role in the management of stigma and the presentation of self. Developing an understanding of literacy and the fundamental differences between written and oral communication led me to understand the prevalence of face-to-face communication among the homeless and poor as different mechanisms for knowing about, ordering, and relating to the world—a difference

that must be accounted for in technology interventions targeted at this community. Issues of legitimacy arose through the ownership and use of technology—from mobile phones to PCs—and the different authority dynamics that determined the boundaries of legitimate use.

While these three areas of investigation framed the early fieldwork, it became clear as I began to scope my design approach at my primary research site that legibility (of technology), literacy (with respect to information and resources), and legitimacy (of modes of use and adoption) were in fact playing out within the context of creating and sustaining Deweyan publics (DiSalvo et al., 2007; DiSalvo, 2009). Through the latter part of my research, the pragmatist notion of publics provided an essential vantage from which to develop a program of participatory design that constructively confronted the political and encapsulated issues of technology’s legibility, the literacies of the staff and residents, and perceptions of legitimate use of technology within the context of my primary research site. Importantly, publics provided a way to conceive of smaller groups of individuals confederated through their attachments to shared issues. At my primary research site, this resulted in recognizing two potential publics: the shelter staff constituted the first public, one defined by the employees at a shelter; the shelter residents constituted the second public and its membership was in perpetual flux as families entered the shelter and shared short-term dependency on it for basic human needs. I understood both publics to be distinct: each facing distinct issues and each with separate needs for organization and coordination. But these two publics were also closely interlinked through the larger issue of coping with and overcoming homelessness.

During the system deployment, several dynamics emerged around the use of the Community Resource Messenger. Tensions already present at the shelter surfaced in new ways—both within and between each public—as a result of adopting the system

and integrating into the shelter’s routines. These findings point to the evolving legibility of the Community Resource Messenger as changes were made to the system between the two phases of the deployment; they show how different modes of literacy were supported with the system, in particular, that the relationship established between staff and residents had an important impact on how the residents used information; and my findings provide evidence that different perceptions of legitimate modes of use had direct impact on engagement with the Community Resource Messenger, shaping the relationships among staff, among residents, and between residents and staff.

The research I have completed has two broader contributions beyond the context-specific findings reported in the previous chapters. First, the outcome from my design and system deployment provides empirical evidence that the notion of Deweyan publics provides an avenue for constructively re-politicizing PD within community contexts through its pragmatist orientation toward identifying with attachments to issues rather than with established stakeholders (Ehn, 2008b; Björgvinsson et al., 2010). The second contribution is that the Community Resource Messenger begins to scope the role and impact of social computing platforms within contexts of service provision—formerly the domain of systems that focused on the rationalization of work rather than on the relationships that sit at the center of that work (Kling, 1978).

11.1 Participatory Design, Publics, & Democratization

The participatory design intervention I ran at my primary research site explored issues around constituting and sustaining publics through the design and use of a technology artifact. The goal was to interrogate modes of production and instigate opportunities for participation and action between two publics—the public of the shelter staff and the public of the shelter residents. Some of these opportunities came through system use and in response to evolving social boundaries, to altered attachments to issues

at the shelter, and to modes of interpreting and adopting different aspects of the Community Resource Messenger. Many of the opportunities, though, came through the design process itself and through an extended design discourse sustained through the first phase of the deployment. This extended discourse created conceptual space for the staff and residents to create and reflect on specific system features, to engage in discourse around individual expertise and experience, and to develop strategies for identifying issues and sustaining action into the future.

It is my contention that motivating PD with the notion of Deweyan publics foregrounds the issues at stake within the context, and not just the stakeholders present and contending with those issues. The theoretical mechanism that enable this shift arise from the privileging of attachments to issues over the established social boundaries of stakeholders. Going back to Marres (2007), by contending with issues, rather than stakeholders, it becomes possible to look for and create alliances that cross or break down established authority structures. In the case of the staff and residents at my primary research site, this kind of realignment was present as the case worker used the Community Resource Messenger to develop and amplify her relationship with the residents in ways that were counter to the wishes of the program director. Within the bounds of the specific issues that prompted those modes of use, the case worker and residents coalesced through their shared attachments to a set of issues—attachments that were not shared universally across the staff.

Where the alignment around issues rather than stakeholders becomes particularly relevant is in the move to bring PD out of settings of production and into community contexts. As noted earlier in Chapter 7, one of the challenges PD research is contending with at the moment is the realization that “forms of participation exist and presently thrive that do not question, but further, dominant power patterns” (Beck, 2002, p. 82). This realization has led to a reinvigoration of PD’s direct engagement with the political and a return to its origins as a practice built around empowering

weak and marginalized groups (Beck, 2002; Björgvinsson et al., 2010). One of the challenges that PD faces as it continues to move into community contexts is that such contexts rarely present the same clear stakeholders with which to align: in the context of empowering deskilled workers, PD had a clear stakeholder group (*e.g.*, worker's unions) with which to align; in community contexts, power dynamics and authority structures implicate many different stakeholders and present a political landscape where evolving attachments to issues constantly reconfigure these relationships. As a result, PD as field may find it more productive to align with issues rather than established stakeholders, and by so doing, become involved in constituting publics through the articulation of issues and through the design of strategies to contend with those issues.

One of the consequences of this orientation, aside from a technology artifact built to support and mediate diverse stakeholders based on their attachments to issues, is the democratizing of technology—that is, bringing interactive experiences and technologies to a wider public for participation, and expanding the boundaries of inclusion. Democratizing technology goes beyond simply increasing the rolls of technology users; it involves bringing diverse and potentially excluded individuals into discourse about technology, its place in society, and its potential for enabling action, facilitating connection, and providing access to information.

Although democracy is a term with multiple, at times conflicting, meanings and methods, I have based my approach to democratization as fundamentally about discourse through participation. The promotion of discourse has an inherent optimism by asserting our ability to overcome social challenges through sharing ideas and engaging with each other (Turner, 2006). This optimism also sits at the foundation of Dewey's notion of publics—organizing around action as a way to confront the challenges facing society. However, while optimistic, my turn toward discourse is not to assume that democracy leads to consensus, but rather that discourse is necessary for

managing contentious social issues. The move away from assumptions of consensus is precisely what Björgvinsson et al. (2010) refer to when invoking agnostic democracy which “does not presuppose the possibility of consensus and rational conflict resolution, but proposes a polyphony of voices and mutually vigorous but tolerant disputes among groups united by passionate engagement” (p. 48). Publics, therefore, provide a way to frame contentious engagement around constructive controversy that recognizes multiple views as legitimate. These features make it important in its own right, but specifically relevant to PD and my development of publics as a frame for both the design engagements that shaped the Community Resource Messenger and the insight I gained from studying its deployment.

As HCI continues to engage with users and contexts further afield from its workplace origins, it is important to consider modes of production and design. Based on the evidence and experience presented in this dissertation, I would argue that PD, combined with the framing of Deweyan publics, provides the necessary methodological and theoretical support for engaging the marginalized and the dispossessed in the development of technologies such that their participation not only fuels the design directions, but creates opportunities for engaging in the political and social context for how those technologies will be used and enacted.

11.2 Social Computing & Service Provision

The uptake of ICTs in the nonprofit social service world is still somewhat limited and uneven. Challenges and issues identified decades ago persist (Kling, 1978; Le Dantec & Edwards, 2010), and the focus of ICT deployment—homegrown or otherwise—tends toward systems that rationalize different aspects of the work practices at the nonprofit organizations in question (Goecks et al., 2008; Volda et al., 2011; Merkel et al., 2007). The driving force behind many of these efforts is the expectation that

the transformations that ICTs ushered into for-profit enterprises would take hold in the nonprofit sector as well.

There are, however, important differences between for-profit and nonprofit enterprises. Technical capacity both in terms of financial resources and trained employees is more constrained in the nonprofit sector; the structure of organizations around a large volunteer workforce has implications for the nonprofit sector (Harrison et al., 2004); and the self-selection that occurs with individuals who go into social service often means the paid staff have chosen their careers based on a desire (and graduate training) to work with and serve vulnerable populations (and are not trained or inclined to develop sophisticated technology-based agendas) (McPhail et al., 1998; Merkel et al., 2007).

One way to distill these differences is that the work of providing social services is an intensely *social* work—it relies on case workers creating relationships with their clients, building out programs of care and services, and engaging in on-going counseling to cope with long-term personal issues or provide guidance through short-term crises. Not only do social service providers self-select from individuals inclined to want to help and become personally involved, the homeless or dispossessed clients of these services seek out need these relationships to mediate services and information (Hersberger, 2001, 2005).

The upshot of these factors is that ICTs deployed in the nonprofit sector would be more effective as platforms to amplify these social connections rather than as means of achieving procedural efficiencies through rationalization of work process. The Community Resource Messenger was just this kind of social platform for supporting the staff and residents at my primary research site. The system was not developed to rationalize work practices at the shelter; there was no effort to decompose or improve the procedures of care the staff at the shelter were using. The system was, however, designed around the attendant issues the staff and residents were facing as

they worked to make the most of available services: sustaining situational awareness among the staff, providing a communication channel to extend the time and kind of support available to the residents, supporting the residents as producers of knowledge rather than treating them simply as consumers of information.

Based on these traits, the Community Resource Messenger can be viewed as a social computing platform built around supporting the temporally bounded social graphs that sprung up with each generation of residents at the shelter. The degrees of freedom in how the system supported communication meant different groups of staff and residents could appropriate the channels that best matched their preferences (via text, via voice, through personal communication, and from the visible announcements on the Shared Message Board). Ultimately, use of the Community Resource Messenger led to improved visibility of information, to amplification of the relationship between staff and residents, and as a resource for residents as they broadened their sources of social support. Furthermore, the differences in use and outcomes between the two phases of the deployment underline the importance of the social interaction over simple information exchange: in the first phase of the deployment, residents whose experience included personal and social use of the technology used the system to gain access to more information and micro-coordination support than those who did not; in the second phase of the deployment, when residents received more messages via the subscription service, but the absence of social messaging with the staff and the lack of reported improvement in sources of social support provide evidence that it is not just information that matters, but the social support and context around that information.

For these reasons, I would argue that social computing systems have a rich and important role to play in the nonprofit social service sector. As I have demonstrated here through the deployment of the Community Resource Messenger, such technologies can

open new lines of communication between the homeless and their care providers, leading to more efficient and frequent communications, better coordination, and improved awareness of resources and needs. The Community Resource Messenger is an example of a social computing system that achieved these outcomes by empowering users to identify and respond to the social issues facing them rather than by encoding specific solutions to those issues. Furthermore, such systems align with the preferences of both service providers and their clients in that they support the development of relationships around the services being sought. For care providers, social computing platforms can help scaffold their resources to effectively manage relationships with multiple clients; for the clients, such systems create an extended connection to individuals providing support and create mechanisms to deal with information overload. The balance to be struck here, though, is that it is a *social* graph that needs to be built—interaction needs to be balanced and reciprocal and rely solely on modes of information broadcast from established authorities. The challenge in creating this balance within the nonprofit service sector is the established authority dynamics between care providers and their clients: social computing may be disruptive to those dynamics as production of and access to information evolves through broader participation.

11.3 Future Work

Despite the the degrees of freedom provided by the Community Resource Messenger, the overarching relationship between staff was bounded by the larger context of homeless care provision. The fact that the system was situated in an emergency shelter for women displaced by homelessness meant the intrinsic need the residents had for help and guidance—the placefulness of the shelter (Harrison & Dourish, 1996)—ultimately shaped how the Community Resource Messenger was used to communicate and organize. While both staff and residents incorporated the Community Resource

Messenger into their practices and routines, the basic relationship of staff as producers and residents as consumers of information was not overtly reconfigured. In fact, the primary challenge left unaddressed by the Community Resource Messenger centers on how to better enlist the shelter residents as producers of information, as the source for knowledge about resources and services, rather than just as collaborative consumers. While I observed instances of production by the residents, it was not a robust pattern of use in either phases of the deployment.

At stake is the question of how to regularly and frequently jump-start the social graph of residents at the shelter. As generations of residents cycle through, each new group of mothers needs to start from scratch; the relatively short time mothers stayed at the shelter only magnified the challenge. Efforts to address this by adding the ability to share photos and create a visual canvas for residents to appropriate did not gain the traction I had hoped for. Even though these features were the result of feedback and co-design from residents who had used the Community Resource Messenger, there was clearly a mismatch with what the residents were willing to engage with in the technology and leaves ample room for future work to further explore technical and social incentives for participation.

Beyond future research focused on developing and tuning social platforms in marginalized contexts, there remain questions around the exploration of Deweyan publics and PD. The relevance of publics for building and studying systems like the Community Resource Messenger is the foregrounding of issues experienced and actions taken by users without encoding particular perspectives or solutions to those issues in the technology itself; that the technology itself is not the solution but rather a means for users to articulate and address a perpetually evolving attachments to issues. The nature of attachments, then, needs further exploration, particularly with respect to notions of values and how HCI accommodates and accounts for values in the design and use of interactive systems.

APPENDIX A

INSTRUMENTS & INTERVIEW GUIDES

This appendix includes the survey instruments and interview guides used in my research. The materials are organized along each research phase: Photo Elicitation Interview, Care Provider Work Practices and Ecosystem, System Design, and System Deployment. Specific details about how these materials were used can be found throughout this document.

A.1 Fieldwork: Photo Elicitation Interview

The Photo Elicitation Interviews (PEI) were conducted with homeless individuals from two research sites.

A.1.1 PEI Instructions to Participants

SETUP

You will be asked to focus on the following areas:

- The places and times where “technology” would be helpful. When I talk about technology I mean things such as a phone, access to transportation, a watch, or even shelter.
 - The types of “technology” you use on a daily basis –pictures that show me how you use it or where you use it.
 - The people you are around.
 - The places you visit, stay, or hang out with friends.
-

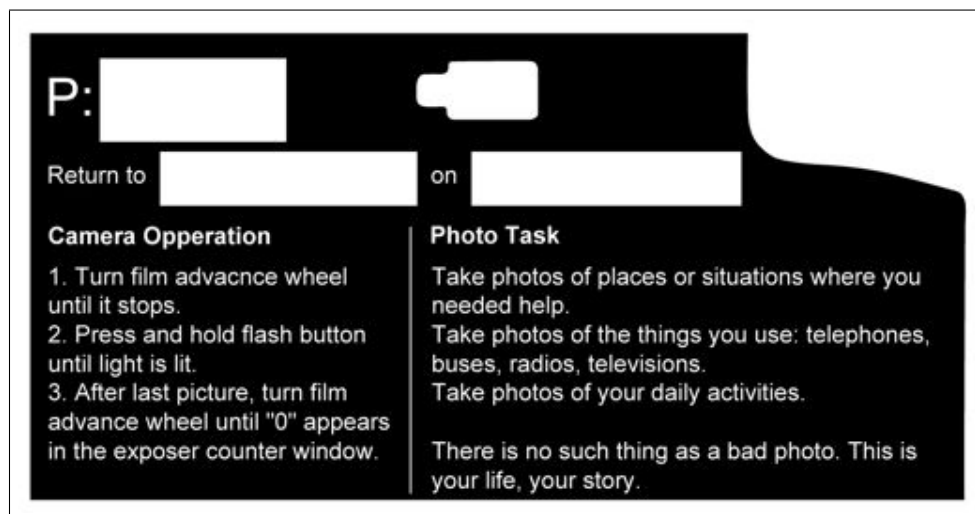


Figure 32: On-camera instructions provided to the study participants

A.1.2 PEI Demographic Survey

Participant #:

Demographic Survey

Instructions

Please circle the appropriate response below. If you do not feel comfortable answering any of the questions you may skip them.

1. Sex:

Male

Female

2. Age:

18 – 25

36 – 40

51 – 55

26 – 30

41 – 45

56 – 60

31 – 35

46 – 50

61 or older

3. Ethnicity:

African-American

Asian

Caucasian

Hispanic

Other

4. What is the most education you have completed?

Some Highschool

Some College

Highschool or GED

Two or Four-year degree

5. Have you ever had to live without a home?

Yes

No

6. If you answered "yes" to question 5, how long were you homeless?

A.1.3 PEI Interview Guide

SETUP

The interviewer will record or take notes of the interview, as appropriate.

SCRIPT

Hi,

Thanks again for taking the time to participate in this project. I would now like to interview you about the pictures that you have been taking.

I'd like to spend most of the time talking about the pictures, but then also ask you some questions about the process of picture taking. It's really helpful for us to hear your feedback and ideas about what we could do for next time.

If there is any picture that you don't want to discuss, that's fine. Also, if there are any questions that you don't want to answer that is fine as well. It's totally up to you how much you want to say. This interview should last about an hour to an hour and a half. If at any point you'd like to stop the interview, just let us know.

WARM-UP

1. Have you looked through your photos?
2. What do you think about your pictures?

QUESTIONS ABOUT PICTURES

(This is going to be open-ended. Rather than ask specific questions about each picture, we'd like to generate free form response from the participants as they come up. This is so we don't miss the key information that they'd like to tell us. However, if the conversation stalls, here are some of the questions we may ask.)

1. What's in the picture?
2. Who's in the picture?
3. What about this picture is important to you?

4. What would you like to tell us about this picture?
5. Who were you with when you were taking this picture?
6. What were you thinking about when you took this picture?
7. When did you take the picture?
8. Where were you when you took the picture?

QUESTIONS WHEN THERE AREN'T PICTURES

1. How do you decide that something is important?
2. What things have you done over the past X weeks that you feel is important?
3. What things do you own or have owned in the past that are important to you?
4. Where there things that you wanted to take a picture of but couldn't?

QUESTIONS ABOUT TECHNOLOGY

1. What do you think of as technology? OR: What kinds of things do you think of when you hear the word "technology"?
2. What kinds of "technology" do you miss or need the most?
3. Do you think of "technology" as helpful to you or to society?

ADDITIONAL QUESTIONS

1. Do you have any questions for us?
 2. Do you have anything you'd like to add that you didn't get a chance to say earlier?
 3. Did we miss anything that was important to you?
-

A.2 Fieldwork: Care Provider Work Practices & Ecosystem

This interview was conducted at each of my field sites with a variety of staff at each location.

A.2.1 Work Practices Interview Guide

SETUP

The interviewer will record or take notes of the interview, as appropriate. Each interview should focus on the services and types of clients the organization serves and should develop around understanding those services and their relationship to peer organizations and partners. These questions are meant to provide launching points for engaging with staff.

1. What services does your organization provide?
 2. What kinds of clients does it serve?
 3. Do you provide active case management or counseling?
 4. How is your organization funded – *e.g.* through government support or private donors?
 5. Is there information that you would like to have but currently don't have access too?
 6. How do the different databases and computer systems you currently use help you? Hinder you?
 7. Are there opportunities for aid to clients that is not used because of technology barriers?
 8. How well are different outreach centers networked together to support and amplify each other's resources?
-

A.3 Design Workshop

The design workshop was a one-day event conducted with representatives from eight of my research sites. The day comprised of three different activities to catalogue the resources, goals, and information flows at each agency followed by a wrap-up session to integrate the generated materials

A.3.1 Workshop Activities

Morning Session	After Lunch Session	Late Afternoon Session
Focus: Available resources Connections between agencies Establishing a sharing model	Focus: Sources of information Information to clients Information to agencies	Focus: Outcomes and goals Client goals & progress Agency goals & accountabilities
Activities: 1. Create resource cards a. Agency specific b. External / complimentary 2. Connect resource cards across agencies a. Sequential connections b. Concurrent connections 3. Discuss / Define how connections work a. Referral patterns b. Requirements 4. External factors on resources a. What is missing from the map b. Relation to the policy ecosystem	Activities: 1. Map information flows a. info about incoming clients b. info about referred clients c. shared v. private info about clients d. shared v. private info about services e. information for service versus information for audit f. (system that captures the info: pathways v. custom / private) 2. Map info clients need a. info about services b. info about agencies c. locations and times to provide information (pro- v. re-active)	Activities: 1. Goal cards for clients a. sort against resources and information. b. sequential goals c. concurrent goals 2. Goal cards for agencies a. sort against information collection / access vectors This last session should provide a way to connect all the content developed.

A.3.2 Workshop Materials

GOALS	Name: _____
	Description: _____
	Pre-requisites: _____
	Next Steps: _____

RESOURCES	Name: _____
	Audience: _____
	Description: _____
	Frequency: _____ Duration: _____
	Provider: _____
	Requirements: _____

Information Flow Map | Agency:

A.4 System Deployment

The system deployment was conducted at my primary research site—a shelter for homeless mothers and their children. Interviews were conducted with both staff and residents, while survey instruments were only collected from residents.

A.4.1 Deployment Interview Guide

SETUP

The interviewer will record or take notes of the interview, as appropriate. Not all questions will be asked to each interviewee—some questions will only be asked of the case manager and some only of the client (as appropriate). This document is only meant to be a guide, the interviews will develop more depth around specific issues as they become apparent.

SCRIPT

Hi,

Thanks again for taking the time to participate in this project. I would now like to interview you about your experience using our system for a week. During this interview I will ask you a series of questions that will rate different aspects of the system. Some of the questions may be about specific messages you received or sent during the week.

If there are any questions that you don't want to answer that is fine. It's totally up to you how much you want to say. This interview should last no more than one hour. If at any point you'd like to stop the interview, just say so.

IMPRESSIONS OF THE SYSTEM

Let's start with general impressions of the system:

1. Describe how you used the system?
2. What is your overall impression of the messages you sent/received? (positive, negative, neutral)

3. Were there message management features you were missing?
4. Did the features support the goals/activities/information sharing you were trying accomplish?
5. Where there other people you would want to communicate with using this system?
6. Was the message history useful to you?
7. Was the web interface easy to understand?
8. What parts of the web interface would you change?
9. Are there goals/tasks/activities you wanted to use the system for but could not?
10. Were you able to view message histories for each of your clients?

MESSAGE CONTENT

Let's talk more about the content of the messages:

1. Were the scripted messages useful/correctly worded/flexible?
2. Were there additional scripted messages you wanted?
3. Did the "customization" of the scripted messages meet your expectations (for example, adding first names of recipients to the message automatically)?
4. Was it easy to set the "To" field in messages?
5. Was the language in the messages easy to understand?
6. Did the messages seem like they came from your case manager (or from a computerized agent)?
7. After message X was sent, there were several follow-up messages, why was this?
8. Was the information in the messages useful?
9. Did you have any concerns in sending messages (to case manager or to client)?

MESSAGE FREQUENCY

Now I'd like to talk about the frequency of sending/receiving messages:

1. Was the ability to schedule messages useful?
2. How often did you use the system to send messages?
3. How often did you use the system to view messages or message histories?
4. Did you feel like the messages were annoying or too frequent?
5. Would you want to be able to say when you should receive messages?

PUBLIC MESSAGES

Finally, let's talk about the public messages on the "bulletin board":

1. Was having an option to send messages to everyone (and not just your case manager) useful?
 2. Did you have concerns about sharing information with the other residents?
 3. Was there information that you thought would be good to share publicly?
 4. How would you feel if the messages you posted to the bulletin board stayed in Hagar House long after you left?
 5. Was it confusing to know where to send an SMS (either to the bulletin board or directly to the case manager?)
-

A.4.2 Deployment Demographic Survey

Participant:

Date: / / .

DEMOGRAPHIC SURVEY

Gender: Male Female

Age: _____

Ethnicity: African America Hispanic
Asian Native American
Caucasian Other

Highest education: Some High School Some College
High School or G.E.D. 2 or 4 year College Degree

Do you own a cell phone? Yes No

What kind of phone plan: Monthly Contract Pre-paid

Do you use text messaging? Yes No

Participant:

Date: / / .

How many texts do you send
per month?

How do you use text
messaging?

Do you own a computer?

Yes

No

How often do you use a
computer?

Where do you use a computer?

How do you use the computer?

Do you use: (circle all that apply)

Email

Web Browser

Social
Networking Sites

Chat

Search

YouTube

A.4.3 Deployment Family Support Scale

Family Support Scale

Carl J. Dunst, Carol M. Trivette, and Vicki Jenkins

Name _____ Date _____

Listed below are people and groups that oftentimes are helpful to members of a family raising a young child. This questionnaire asks you to indicate how helpful each source is to ***your family***. Please ***circle*** the response that *best describes* how ***helpful*** the people and groups have been to your family during the past 3 to 6 months. If a source of help has not been available to your family during this period of time, circle the NA (Not Available) response.

How <i>helpful</i> has each of the following been to you in terms of raising your child(ren)?	Not Available	Not at All Helpful	Sometimes Helpful	Generally Helpful	Very Helpful	Extremely Helpful
1. My parents	NA	1	2	3	4	5
2. My spouse or partner's parents	NA	1	2	3	4	5
3. My relatives/kin	NA	1	2	3	4	5
4. My spouse or partner's relatives/kin	NA	1	2	3	4	5
5. My spouse or partner	NA	1	2	3	4	5
6. My friends	NA	1	2	3	4	5
7. My spouse or partner's friends	NA	1	2	3	4	5
8. My older child(ren)	NA	1	2	3	4	5
9. Neighbors	NA	1	2	3	4	5
10. Other parents	NA	1	2	3	4	5
11. Co-workers	NA	1	2	3	4	5
12. Parent group members	NA	1	2	3	4	5
13. Social groups/clubs	NA	1	2	3	4	5
14. Church members/minister	NA	1	2	3	4	5
15. My family or child's physician	NA	1	2	3	4	5
16. Early childhood intervention program	NA	1	2	3	4	5
17. School/daycare center	NA	1	2	3	4	5
18. Professional helpers (social workers, therapists, teachers, etc.)	NA	1	2	3	4	5
19. Professional agencies (public health, social services, mental health, etc.)	NA	1	2	3	4	5
20. _____	NA	1	2	3	4	5
21. _____	NA	1	2	3	4	5

Family Support Scale Scoring Sheet

- A. Enter the individual item scores in the shaded spaces provided (i.e., the respondent's rating [1,2,3,4, or 5]).
 Items rated NA are scored 0 (zero) for purposes of determining helpfulness scores.
- B. Sum the scores to obtain total subscale scores for the five major sources of support.
- C. Divide the subscale scores by the number of items per subcategory to obtain an average score (for comparative purposes).
- D. Sum the unadjusted scores for the four informal sources of support subcategories to obtain the Informal Social Support Score.
- E. The unadjusted score for the professional services subcategory is the Formal Support Score.
- F. Sum the unadjusted scores for all 19 items to obtain the Total Family Support Scale Score.

	Sources of Support				
	Kinship	Spouse/ Partner Support	Informal Support	Programs/ Organizations	Professional Services
A. Item Scores					
1. My parents					
2. My spouse or partner's parents					
3. My relatives/kin					
4. My spouse or partner's relatives/kin					
5. My Spouse or partner					
6. My friends					
7. My spouse or partner's friends					
8. My own children					
9. Neighbors					
10. Other parents					
11. Coworkers					
12. Parent group members					
13. Social groups/clubs					
14. Church members/minister					
15. Family/child's physician					
16. Early intervention program					
17. School/day care					
18. Professional helpers					
19. Professional agencies					
B. Sources of Support Subscale Scores					
C. Adjusted Sources of Support Scores					
D. Informal Support Score	+	+	+		
	Total from Line D				
E. Formal Support Score					
F. TOTAL SCALE SCORE					

APPENDIX B

SYSTEM USER GUIDE

The following user guide was provided to the staff at the primary research site. It details all of the functionality of the Community Resource Messenger and provides comprehensive documentation for how to use the system to manage clients (in the system), send messages, and post messages to the Share Message Board (referred to as the Big Board).

Atlanta Community Resources

User's Guide

This document covers how to use the messaging features of **atlantacrm.org**.

For **any questions** about how to use the web site, or for **technical support** please contact:

Chris Le Dantec

404 319 9840

ledantec@cc.gatech.edu

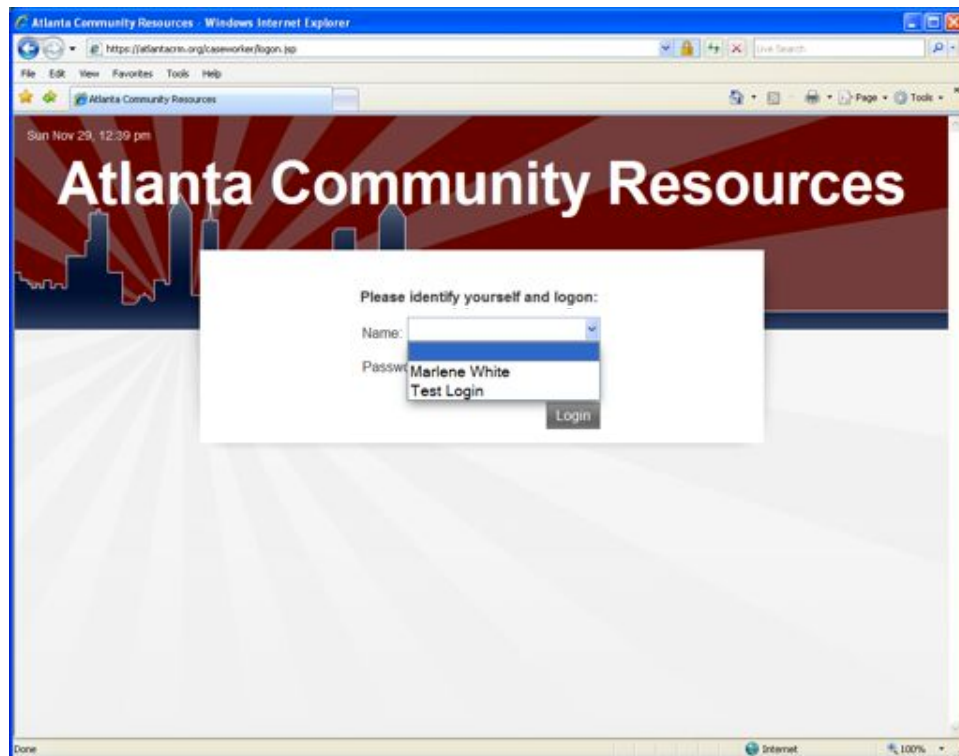
Getting Started	1
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Getting Started

This document provides instructions for how to use all of the features of **atlantacrm.org**.

Logon

When you enter **atlantacrm.org** into your browser address box, the first thing you will see is a logon page.

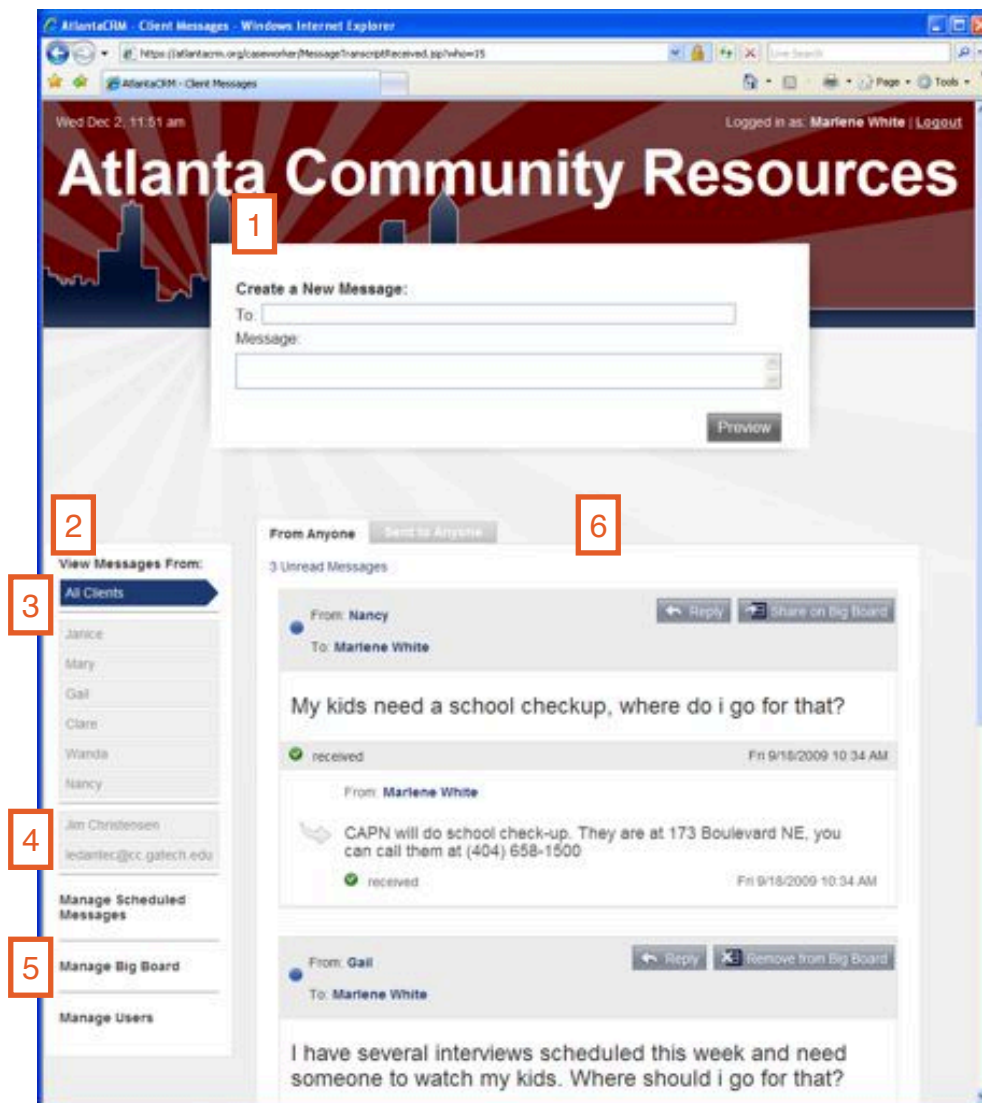


To logon please select your name from the combo-box and enter your password. An account will have been setup for you. If you do not see your name in the list, please contact Chris Le Dantec.

Main Page

After logon you will be taken to the main page of Atlanta Community Resources. Everything you need is accessed from this page.

The main page collects all of the features together in one place, here we provide a brief overview of those features. More information on each is available in the rest of this document.



1. **Sending Messages:** This form lets you send messages to your clients. You may send a message to one or more of your clients by typing in their names, separated by commas (e.g. Janice, Mary, Gail). The message you enter will be sent to your client's cell phones so remember to keep it short and to the point.
2. **Sidebar:** The sidebar contains the list of clients, including clients not assigned to the case worker currently logged in, and links to additional features at the bottom of the sidebar.
3. **Assigned Clients:** By default, "All Clients" is selected (in blue) and indicates that the messages you are viewing are from everyone at Hagar House. By clicking on a client's name you can limit the messages you are looking at to only those that have been sent to, or sent from that client.
4. **Unassigned Clients:** The second group of names are those clients who are not assigned to the case worker currently logged in. Please note that this list of unassigned clients may not exist if all clients are assigned to the case worker currently logged in.
5. **Additional Features:** At the bottom of the list of clients are options to take you to different features of atlantcrm.org: Manage Scheduled Messages, Manage Big Board, and Manage Users. Depending on where you are on the web site, these option will change (so if you are managing users, you will not see the Manage Users link).
6. **Messages:** There are two tabs, one for viewing all the messages you have received and one for viewing all the messages you've sent. In each of these tabs messages are show individually, listing who sent them and to whom they were sent. You will also find two buttons, one that will allow you to reply to the message and one that will allow you to post (or remove) the message to the Big Board.

Sending Messages

This section provides more detail on sending messages to clients. All messages sent through the web site will be delivered to clients cell phones (according to the phone number listed in Manage Users).

Adding Recipients

To add a recipient for a message, simply type in their name in the “To” field. A drop down will show up to assist adding names to the list. You may send a message to a single client, or you may send one to multiple clients by adding all of their names to the field, separated by commas.

A screenshot of a web form titled "Create a New Message:". The form has a "To:" label followed by a text input field containing "Mary, Janice, Ga". Below this is a "Message" label followed by a larger text input field containing "Gal". At the bottom right of the form is a "Preview" button.

Composing the Message

Type the message you want sent into the Message field. Please remember that these messages will be sent as SMS (or text) messages to the client's phone. Normally, each SMS is limited to 140 characters, so keep you messages short.

You may send longer messages but be aware that they will be broken into separate messages once sent. When sending long messages, keep in mind that some cell phones do not reassemble multi-part messages correctly, so the client may be reading the parts of your message out of order which may cause confusion.

When sending a message to multiple people, you may add special text to automatically insert the name of each person in the message they receive. By adding [NAME] (including the [])'s) you can create a message like:



The image shows a web-based form titled "Create a New Message:". It has two main input fields. The first is labeled "To:" and contains the text "Mary, Janice, Gail". The second is labeled "Message:" and contains the text "Hey [NAME] please remember to bring your resume to the group meeting this week." Below the message field is a button labeled "Preview". The form is set against a light background with a dark border.

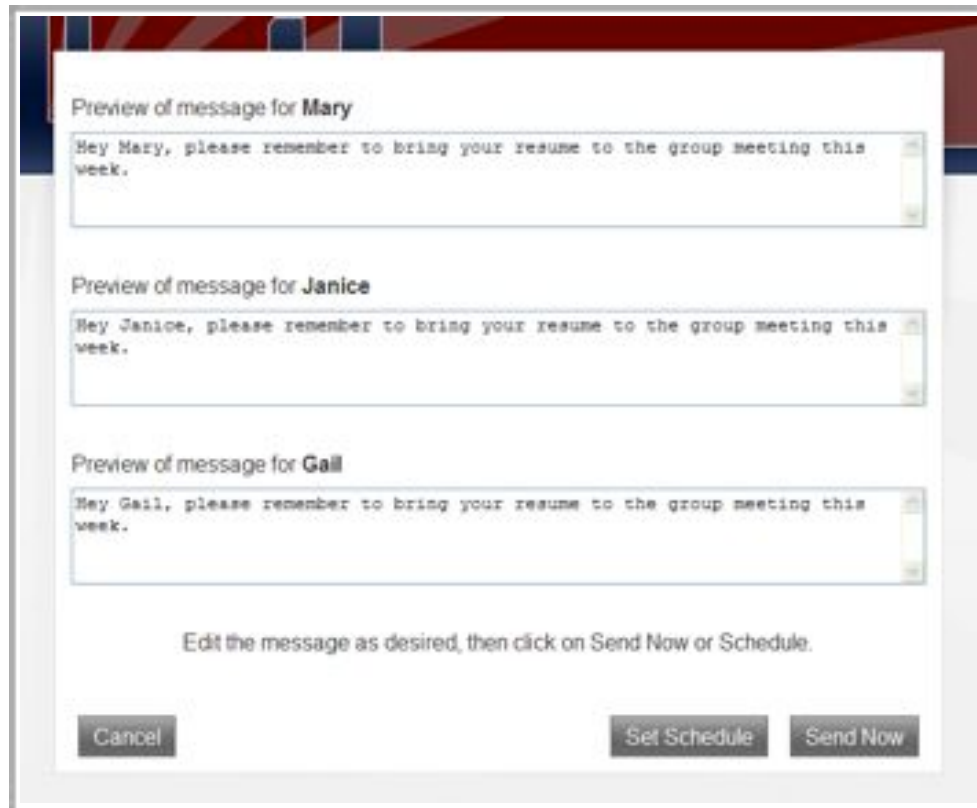
When this message is sent, each recipient will receive an SMS with their name in it. For example, the above message would be sent to Gail like this:

Hey Gail, please remember to bring your resume to the group meeting this week.

When you are done writing your message, click the **Preview** button to proceed.

Sending Now

Once you have clicked Preview you will have a chance to double check the message before sending it. In cases where you are sending the same message to multiple clients, you will see a box for each client. This gives you one last chance to personalize messages



Preview of message for **Mary**

Hey Mary, please remember to bring your resume to the group meeting this week.

Preview of message for **Janice**

Hey Janice, please remember to bring your resume to the group meeting this week.

Preview of message for **Gail**

Hey Gail, please remember to bring your resume to the group meeting this week.

Edit the message as desired, then click on Send Now or Schedule.

Once you have made any desired personalizations to the messages, you can send it by clicking the **Send Now** button. Once the message is sent you will be returned to the main page.

You can check on the status of the sent message by clicking on the Sent Messages tab. Initially the message status will read "Pending" but after a few minutes, it should change to "Sent".

Scheduling Message Delivery

Instead of sending messages immediately, you may send a message one or more times in the future. To set when you would like a message sent, click the **Set Schedule** button and a clock and calendar will appear below the message previews.

The screenshot shows a dialog box titled "Preview of message for Gail". Inside, there is a text area with the message: "Hey Gail, please remember to bring your resume to the group meeting this week." Below the text area, it says "Messages to be sent at 2 PM on 12/08/2009, 12/15/2009, 12/22/2009". To the left of the calendar is a clock face. To the right of the clock are two radio buttons labeled "AM" and "PM", with "PM" selected. To the right of the radio buttons is a calendar for December 2009. The calendar shows the days of the week (Su, Mo, Tu, We, Th, Fr, Sa) and the dates. The date 12/03 is highlighted with a red box. Below the calendar is a button labeled "Show This Month". At the bottom of the dialog box are three buttons: "Cancel", "Cancel Schedule", and "Send".

Click the hour on the clock that you would like the message sent—be sure to check that the correct AM/PM is selected. If you do not choose an hour, messages will be sent at 10am on the selected dates.

To select the day to send the message, just click the desired day on the calendar. You may select multiple days. To unselect a day, simply click it again and it will indicate that it is no longer selected.

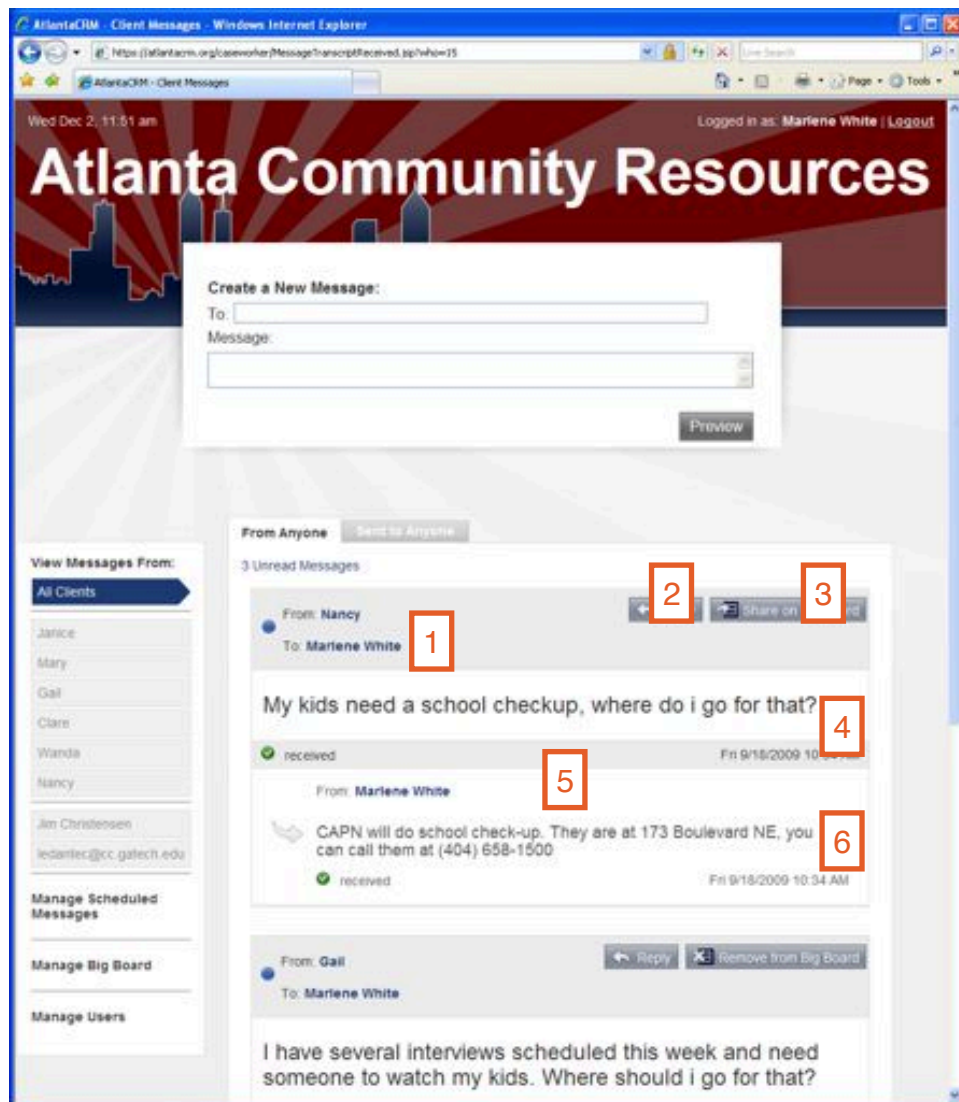
Above the calendar is a list of dates that the message will be sent. Use this list to double check the schedule is correct.

If you wish to cancel the schedule and send the message now, simply click **Cancel Schedule** and the future dates will be cleared and you can proceed to send the message immediately.

Managing Messages

Message management is a significant part of what the atlantacrm.org website tries to provide. It acts as a single location to both send (see above) and receive messages from clients. This section describes how messages will appear, how to sort through them, and how to reply to or post messages to the Big Board.

Messages are displayed as they arrive (or as they are sent) with the newest message at the top of page. Each message is displayed in its own box, along with relevant information and any associated replies:



1. The message header displays who sent the message and to whom it was sent. For messages sent from clients, the To field is based on which case worker(s) are assigned to that client (see Managing Users for more information). All case workers at Hagar House may see all messages, regardless if the client is assigned to them or not.
2. The **Reply** button will open a text area below the message for sending a reply to the sender.
3. The **Post to Big Board** (or **Remove from Big Board**) sets whether or not the message is displayed on the Big Board in the common room. This button lets you easily share information with a larger audience without having to send clients another SMS message.
4. The body of the message is displayed in the middle of the box.
5. The bottom status area shows the message status (e.g. sent, pending, or an error) along with the date and time the status was updated.

If you see many sent messages that are stuck with the status “pending” or one that displays an error, please contact Chris Le Dantec.

6. The reply area below the initial message lists all replies with a similar organization of to/from, message body, and message status.

Messages From and Messages To

Messages are divided into two tabs, one tab for received messages (Messages From...) and one tab for sent messages (Messages To...)

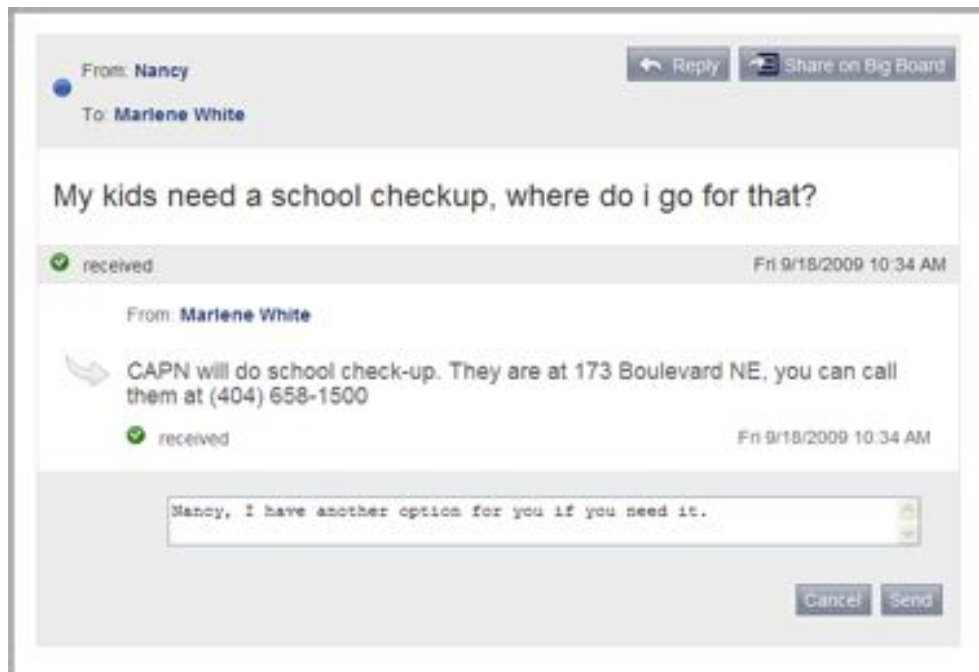


By default, you will see messages from and to all of the clients listed in atlantacrm.org. If you want to only see messages from a specific client, click that client's name in the list of the left side of the page, or click their name in one of the message headers.



Replying to a Message

To reply to a message, click the **Reply** button. A text area will appear below and you may enter the reply message there.



Clicking **Send** will send the message immediately. Please note, that when replying to a message, there is no option to preview or schedule the reply.

Adding a Message to the Big Board

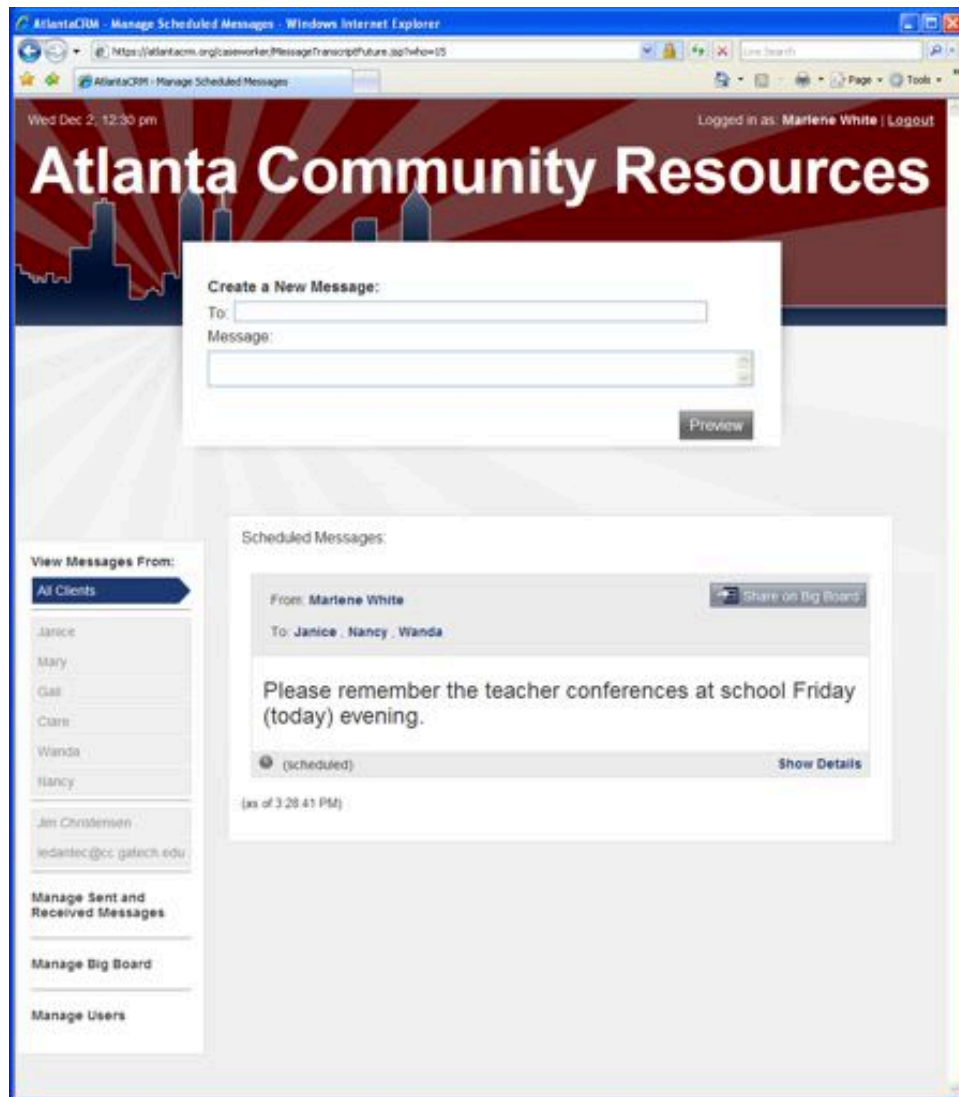
If a message you have received or sent would be interesting to others in Hagar House, you can post it to the Big Board. Adding a message to the Big Board is done by clicking the **Share on Big Board** button. Once clicked, the message will be added to the list of messages that will appear on the Big Board.

You can un-share a message by clicking the **Remove from Big Board** button. This will not delete the message, it will simply remove it from the list of messages to share.

For more information on managing content on the Big Board, see the section Managing the Big Board.

Managing Scheduled Messages

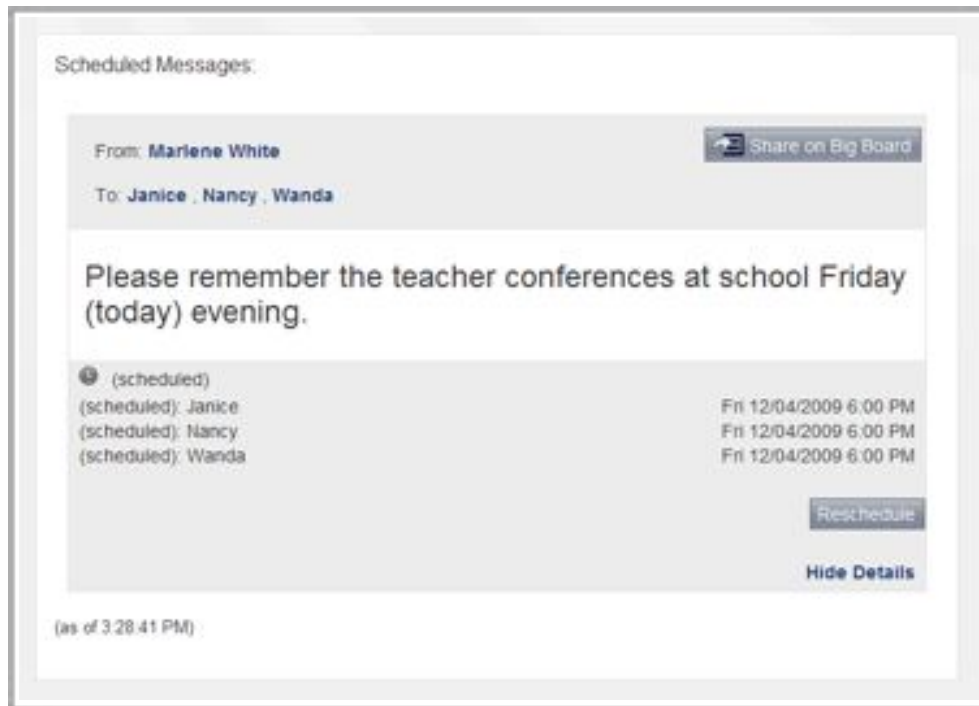
You can manage messages you've scheduled for future delivery by clicking "Manage Scheduled Messages" in the sidebar.



As with managing messages that have been sent or received, you may filter scheduled messages by client by clicking their name on the sidebar. Likewise, you may post scheduled messages to the Big Board by clicking the **Share on Big Board** button.

Scheduled Message Details

You can examine details about the scheduled message by clicking the “Show Details” link at the bottom of the message.



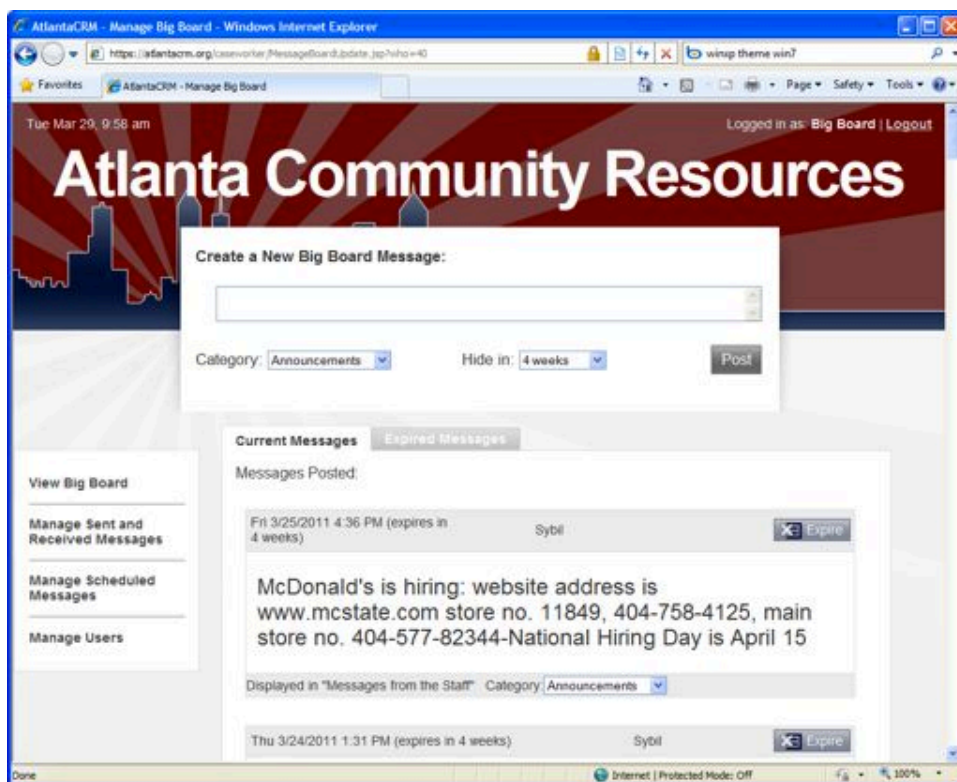
The details section will show who the message is scheduled for and when it will be sent next. To make changes to the scheduled message click the **Reschedule** button. This will take you the message preview screen (see Sending a Message for a screenshot on page 6) where you may edit the content of the message and change the message’s schedule. You may also delete the message so it will not be sent.

Managing the Big Board

The Big Board is the display installed in the common room where messages from staff, messages from clients, and housing and other information are made available to everyone.

To manage the Big Board, click the **Manage Big Board** link in the sidebar.

When the Manage Big Board page loads, you will see a form to post a message to the Big Board, as well as two tabs, one that lists the messages currently active on the board (those that will be seen) and messages that have expired (messages that will not be seen).



Adding a New Message to the Big Board

There are four ways to add a message to the Big Board.

1. As described above in Managing Messages, click the **Share on Big Board** button on a message sent to or received from a client.
2. Use the form at the top of the Manage Big Board page to send a message to the Big Board. When you send a message to the Big Board from the form you can set the category of the message and how long the message will be visible by setting when to “hide” the message. Categorized messages will show up on the Big Board in their respective category. The default category is “Announcements” and messages will be hidden after 4 weeks by default.



3. Send an SMS from your phone to 404 954 1393.
4. Finally, you can send email to info@atlantacrm.org and the message will appear on the Big Board.

Messages added to the Big Board by SMS or by sending an email are automatically set to never expire. You may manually expire a message by clicking the **Expire** button.

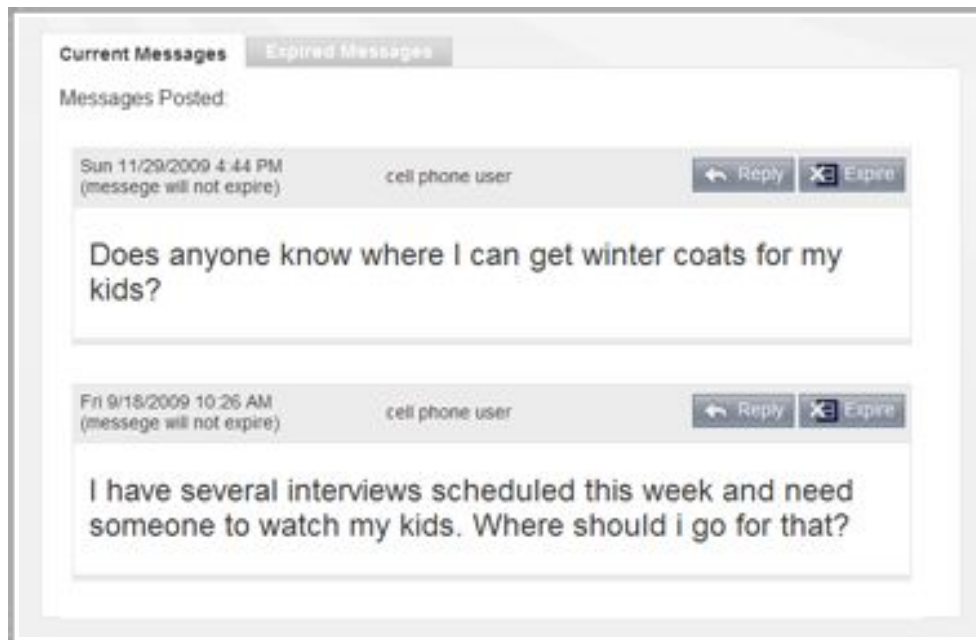
Replying to a Message

Replying to a message on the Big Board is the same as replying to a message sent from a client. Click the **Reply** button and enter your message in the text area that appears.

Replies will be posted to the Big Board in a way that indicates the messages are related.

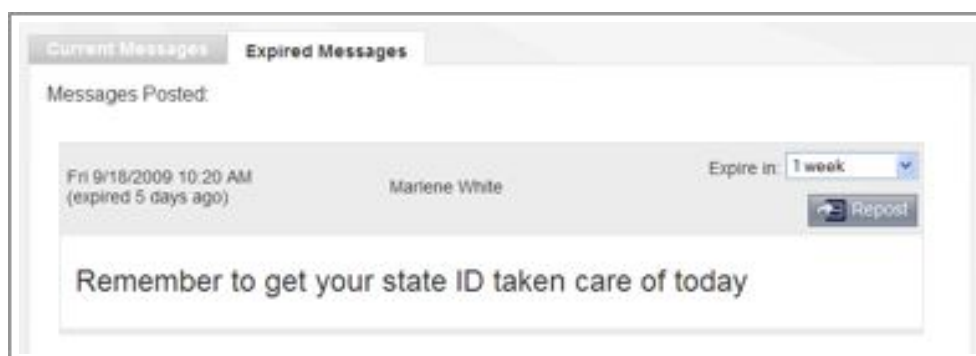
Expiring a Message from the Big Board

To remove a message from the Big Board, click the **Expire** button in the message header.



Expired Messages

When a message has expired it will appear in the Expired Messages tab. You may repost messages in this list by clicking the **Repost** button. The length of time the message will be visible is set in the combo-box above the button.



Managing Users

You may need to add new clients, edit the information on current clients, or disable current clients. To do this, click the Manage Users link in the sidebar.

Please note that you are only able to add new clients. If you need an additional case manager or staff member added, please contact Chris Le Dantec

The Manage Users page has a form at the top of the page for adding new clients. You may edit the information of existing clients in the list of clients below the new user form.

AtlantaCRM - Manage Users - Windows Internet Explorer
https://atlantacrm.org/CaseWorker/John.aspx?u=40
Logged in as: Big Board | Logout
Tue Mar 29, 10:00 am
Atlanta Community Resources
Add New Client:
Client Name:
Client email:
Client Mobile Number:
Assigned Case Worker: Select a Caseworker
Add User
4 Users:
Name: Test
Email: test@test.com
Mobile Number: 555 555 5555
Assigned to: Sybil
Add a Caseworker: Select Caseworker
Notifications:
☐ Announcements
☐ Collage
☐ Employment
☐ Local Events
☐ Health & Wellness
☐ Housing
Save Changes
Disable User
Name: Test2
Notifications:

Adding a New User

Use the form at the top of the page to enter basic information about the client.

Add New Client:
Client Name:
Client email:
Client Mobile Number:
Assigned Case Worker: Select a Caseworker
Add User

Editing Existing Users

You can edit the information of an existing client by finding their form in the page.

The screenshot displays three identical user editing forms stacked vertically. Each form contains the following fields and controls:

- Name:** Text input field (e.g., "Charlotte", "Erica", "Mia").
- Email:** Text input field (e.g., "Test@test", "test@test", empty).
- Mobile Number:** Text input field (e.g., "678241235", "4041231234", "4043214321").
- Buttons:** "Save Changes" (with a person icon) and "Disable User" (with an 'X' icon).
- Assigned to:** Text field showing "Sybil".
- Add a Caseworker:** A dropdown menu labeled "Select Caseworker" and an "Assign" button.
- Notifications:** A list of checkboxes: "Announcements", "Collage", "Employment", "Local Events", "Health & Wellness", and "Housing".

When you make changes to the client's name, phone number, or email address, you must click **Save Changes** for the changes to go into effect.

A client may be assigned to more than one case worker (or staff member). To assign an additional case worker, find them in the combo-box and click the **Assign** button.

When a client has more than one case worker assigned, each will be listed along with a **Disable** button. To remove a case worker assigned to the client, click the **Disable** button next to the case worker's name.

Along the right side is a column of notification check-boxes. These correspond to the categories in the Big Board. Selecting one or more of the categories will automatically send new Big Board messages in that category to the client's cell phone. Clients may unsubscribe from all notifications by sending a message "unsubscribe".

For assistance of any kind, contact Chris Le Dantec: ledantec@cc.gatech.edu or 404 319 9840

Finally, when a client moves on from Hagar House, you can disable their account from atlantacrm.org. Click the **Disable Client** button and the client will no longer show up in the client list.

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