Exploring Mobile Technologies for the Urban Homeless

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Abstract
My research examines the practical and social impact of technology on the urban homeless. To accomplish this, I have conducted interviews with the homeless to understand how technology—from mobile phones to bus passes—affects their lives. I have also conducted ethnographic fieldwork at care providers to understand how technology figures into the provision of care for the homeless. These formative studies have motivated the design of a set of information sharing services that aggregate information available in the community and provide it to the homeless via mobile phones. I will deploy this system to diverse set of homeless individuals to better understand how such technologies fit within the social and economic constraints of the homeless community. I expect my research to result in theoretical contributions and guidelines for designing for uncommon users, like the homeless.

ACM Classification Keywords
K.4.2 Social Issues

General Terms
Design, Human Factors

Author Keywords
Social Computing, Values in Design, Urban Computing, Homeless

Introduction
The rapid expansion of the mobile computing platform and the accompanying ubiquitous connection to data and

communication presents opportunity and consequence for modern society. On one hand, the luxuries of new high-powered personal devices like smart-phones create opportunities for work and leisure where none previously existed; on the other hand, their impact on how we interact socially has consequences for individuals without access.

My research is focused precisely on that second category of users: the individuals and social groups who are considered marginal, who may by choice, by education, or by institutional bias remain at the periphery of the mainstream and importantly, those who remain under-served by many of the technological innovations that have come to symbolize the turn of the millennium. In short, my research is focused on the impact of digital technologies on the urban homeless.

While social scientific and public policy research has long focused on such marginalized communities (e.g. [3, 4, 5]), computing research has only recently begun to consider it as a context for study and intervention (e.g. [2]). Engaging the urban homeless presents a unique and local opportunity to understand the social consequences of technology and to explore the space for successful innovations. As a marginalized and sometimes invisible community, their needs are often overlooked especially as technological advances sweep through the institutions and societies in which homeless individuals and families are struggling to maintain stability and social legitimacy.

I have chosen to focus my research on the urban homeless because they are a diverse community whose individuals may be most affected by technology but for whom technology is often perceived of as an inappropriate luxury. The central question driving my research is: *How can mobile technologies empower the urban homeless, impacting their ability to utilize social services, establish stability, and interact as socially legitimate individuals within the broader urban community?*

To answer this question, I am building a set of services that integrate community resources—like shelters, employment services, medical, and legal services (among many other)—with context-aware information delivery that presents actionable information via mobile phone. In addition to what might be called institutional information, I am working with the homeless to capture the local expert knowledge used within the community. I am calling this second category of information informal as it is derived from the experience of being homeless, rather than from external assessments of what people who are homeless might need.

In working with the homeless community, I am not looking to "solve" homelessness *per se*: 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. I do, however, argue that thoughtful technological interventions can be deployed as part of the larger effort to redress the inequities of the domestic digital divide that contributes to the marginalization of the urban homeless.

Formative Research

My research to better understand how digital technologies impact the homeless began with two empirical studies; one that developed a more expressive understanding of homelessness as a context for design [6], and a second that examined the unique context of the non-

profit and the organizational and informational constraints unique to the nonprofit world [7].

In the first study [6], several themes emerged as compelling approaches to designing technology for the homeless; however, mobile phones stood out for their unique and valued place in the lives of my study participants. The value of the mobile phones was in part due to the critical functional role the mobile phone played as a device for staying in touch with friends and family, but also for the *social* role the mobile phone played as a signifier of stability and of social legitimacy.

Most importantly, this study highlighted the degree to which addressing the technology needs of such marginalized communities is not merely a matter of making cheaper technology, but rather of making fundamentally different technology. It points to culturally situated efforts as being more important when addressing the inequities of access—both to technology, and to information mediated by technology—than economically focused efforts.

In my second study [7], I completed observational fieldwork and unstructured interviews in order better understand the work practices at two nonprofit service agencies. The study focused on the organizational landscape, the personnel composition, and the use of digital technologies at two agencies who provide different sets of services to the homeless and extremely poor of Atlanta.

In my study sites, the high reliance on a volunteer workforce meant that developing expertise and stability in certain job roles remained a challenge—pointing toward the need for more regimented workflow systems to help enforce procedure and policy across generations of staff and volunteers. However, as a counter-point, the diversity present across the two nonprofit organizations I studied also showed how mandated, one-size-fits-all systems are insufficient at best and at worst compromise the discretionary powers of case managers.

These two studies form the foundation of my proposed research which looks to leverage the mobile phone as a recognized technology among the homeless and create a set of basic services that amplify relationships the homeless have with each other, with their social support networks, and with the social service institutions upon which they depend.

Proposed Research

To better understand how mobile technologies might be used within the unique social and economic constraints of homelessness, I am building a system called the Community Resource Map (CRM). Briefly, the CRM will include static information on shelters, counseling services, soup kitchens, employment training, healthcare, etc., blended with dynamic data such as real-time availability of particular resources. The map will blend these information resources to support location-based and context-aware information delivery to mobile phones owned by (or provided to) the homeless individuals I am working with. The system will be deployed to a diverse cross section of homeless individuals over a multi-month period.

I will examine the use of the CRM with three complimentary lenses first discussed by Brewer and Dourish [1]: legibility, literacy, and legitimacy.

Legibility

The specific research question I am asking with respect to legibility is: *How does access to purposefully designed technology impact how homeless individuals interpret the urban environment and the opportunities available to them?* Answering this question will focus specifically on

the ways that homeless individuals understand and interpret access to available social services based on their location, their need, and their identity. In designing technology to explore the legibility of space and information, I will be addressing the challenge of information overload faced by the homeless by providing more personalized delivery of information from both social and institutional sources.

Literacy
Under the rubric of literacy, the specific research question I am asking is: *How does adding specific capability to a familiar technology (the mobile phone) alter the way the homeless interpret and use that technology as a tool for interacting with society?* This question is a response to the desire to understand how to design technologies that scaffold adoption and integration 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 will explore alternative representations of information delivered through the mobile phone to both better respond to the user and to extend our understanding of design and interaction techniques for this user community.

Legitimacy
Where legibility and literacy frame my investigation around how technological interventions impact how a social space is understood and acted upon, legitimacy speaks to the socially constructed status of the provision and use of technology. So here, the question derived from considering legitimacy of use is: *In what ways do forms of legitimacy influence the legibility afforded by technological artifacts and the literacy of the intended users?* This question is meant to provide insight into the situated constraints present when designing technologies for the uncommon user, specifically looking at the different kinds of power relationships that come to bear on their lives.

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