Designs on Mobility: Perceptions of Mobile Phones Among the Homeless

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ABSTRACT

How does the context of homelessness affect mobile phone use among homeless adults and what does that tell us about designing with and for this community? In this paper, we attempt to lay out the context and perceptions surrounding mobile phone use among homeless adults. We conducted a qualitative study of the homeless residing in both transitional housing and on the streets of Downtown San Diego. These findings reveal the unique technological needs and uses that arise from being homeless and we suggest how this data should be taken into account when designing mobile systems for this community.

Author Keywords

Homeless; Urban Computing; Value-Sensitive Design; At-risk populations; Mobile computing

ACM Classification Keywords

K.4.2. Social Issues: Miscellaneous

INTRODUCTION

In the five years since Le Dantec and Edwards produced *Designs on Dignity*, the foremost ethnographic study on the role of technology in the lives of a metropolitan homeless community, the scope and role of technology in our daily lives have been transformed immensely. We believe this holds true among homeless communities as well, though a definitively different context should yield different patterns of use.

Thus, the goal of our research is to understand the use of mobile phones in the unique context of homelessness, exploring emerging needs and themes surrounding their use. By doing so, we can better understand the evolving perceptions, implications and opportunities relevant when designing with and for this community.

Figure 1. Participant texting

RELATED WORK

In the past decade, the rise of ubiquitous computing has been exponential. These developments have been particularly concentrated within the space of personal computing—specifically, mobile computing devices. In effect, the cellphone is regarded to be the most quickly adopted technological innovation in history and the Pew Internet and American Life reports that 91% of American adults owned a cellphone in 2013 [7, 2].

Both sources in the media and academia have taken a keen interest in exploring the possibilities afforded by this technology. Specifically, HCI research has dedicated a whole body of research to mobile technology called Mobile HCI. Mobile technology truly furthers the realm of ubiquitous computing, affording the exploration of new contexts and patterns of use of a pervasive new form factor.

However, a fundamental problem has quickly emerged as this trend has become ubiquitous: these devices are inherently designed for users who can provide the most profit for business. Consequently, mobile phones have ingrained their position in public spaces, creating private gateways that further marginalize those who cannot afford to own such devices. Boundaries to keep the homeless in the periphery are no longer simply reinforced by socioeconomic means, but rather, virtual ones as well [1].

Nonetheless, the cost of mobile phones and personal computing has been decreasing, which has gradually allowed for the penetration of these virtual boundaries. Current research has moved into the realm of exploring the opportunities mobile technology affords in order to break socioeconomic boundaries. For example, there is a thriving body of literature revolving around health interventions delivered by various forms of low-cost technology [3, 8].

Other research has focused on the homeless community itself. Prior work by Le Dantec et al. has begun to explore the state, perceptions, and unique needs of technology among the homeless as a means of understanding the challenges with both working with and designing for these populations [4]. However, only a portion of this work was dedicated to the use of mobile phones.

Therefore, we were surprised to find there existed a gap in HCI literature with regard to the ethnographic understanding of mobile phone use among the homeless adult population. Other related work has been narrowed to various demographics, such as the homeless youth and their use of mobile technology [10, 9], or have focused on implementations of systems [9].

Thus, we hope to set the groundwork of an ethnographic approach to understanding how mobile technology is perceived and used by homeless adult communities. This baseline understanding of use is necessary before any attempt can be made to implement interventions or infrastructures utilizing mobile technology for this community. We also hope to contribute to the literature concerning mobile use among hard to reach populations, not just in the developing world, but in communities local to us. There has been some progress in utilizing mobile phones to reach these local underserved populations; however, significant needs have yet to be addressed [6].

Though literature has converged to establish that there is not just one kind of homeless community, definitions help welfare institutions and task forces understand the situation of the homeless[4]. For example, the US Government defines homelessness in the Stewart B. McKinney Acts, 43 U.S.C. as

> people who lack a fixed, regular, and adequate nighttime residence, and people with a primary night time residence that is

> (A) a supervised publicly or privately operated shelter designed to provide temporary living accommodations;

> (B) an institution that provides temporary residence for individuals intending to be institutionalized; or

> (C) a public or private place not designed for or ordinarily used as a regular sleeping accommodation

Therefore, the instability of the environments experienced by the homeless reveals a definitively different context that is little understood in the light of technologies that have permeated socio-economic boundaries.

METHOD

Thus, in order to understand how the context of homelessness affects the use of mobile devices, it is first necessary to establish what exactly makes up a homeless context. Therefore, we decided to pursue our research as a qualitative study, observing and interviewing participants in situ. We interviewed both members temporarily residing in homeless shelters and others residing on the streets. We visited soup kitchens and the "Skid Row" of San Diego, around the Imperial and 15th intersection, over a period of four weeks.

We were aware of our status as outsiders to this community and understood the need to adapt accordingly in order to build trust. We also understood the ethical implications of working with a vulnerable population and made participation in the study as completely voluntary as possible. Most participants approached us first as we wanted to avoid the risk of imposing our status as researchers upon members of this community.

Potential participants were given a brief introduction about the study as we addressed any questions or concerns they had about the study. Some interviews were audio recorded while others declined to be recorded. Study participation was approved by the Institutional Review Board.

Figure 2. Interviews around the Imperial and 15th intersection

Study Design and Analysis

Each study took place as a 20-30 minute interview, structured around predefined guiding questions about their use of mobile phones. These questions were used as a basis to probe for additional in-depth questions to further understand the participants' underlying motivations and feelings about the subject matter.

After transcribing and organizing the data collected, we parsed through the results to see what themes emerged. The themes were organized in two categories, those that pertained to context and others to use. These results are rec-

orded below in our findings and their implications are considered in the discussion that follows.
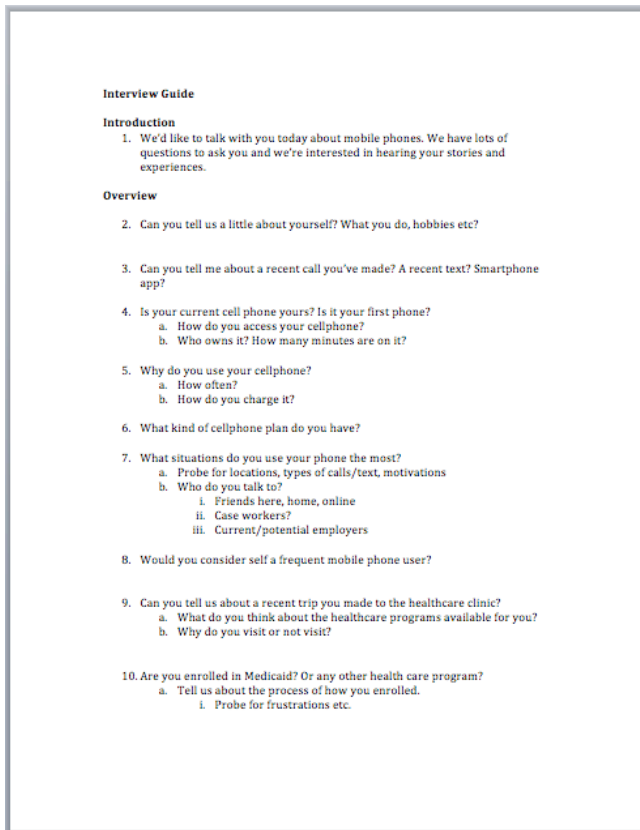

Figure 3. Interview guide distributed to researchers

FINDINGS

Over the course of a four-week period, we collected data from 15 participants, 5 of whom allowed audio-recording. All of the participants are male with their ages ranging from 27 to 70 years old. The lengths of homelessness also varied greatly, from 5 days to 5+ years. Additionally, 73% of the participants were temporarily residing at a homeless shelter, while 27% were living without any housing assistance. In regards to phone ownership, 27% currently own a smartphone, and another 45% currently own a regular mobile phone.

Context

A number of factors, including the lack of reliable access to information, have unfortunately contributed to a pervasive tendency to unite the many diverse members of these communities into a single conceptual group. Aligning with this premise that "there's not just one kind of homeless population," our findings are structured in part by the highly variable contexts that occur across these communities, many of which extend past what modern mobile devices are designed for. Such variations in context include: limited guarantees in infrastructure, lack of security, rapidly evolving circumstances, and uncertainty of resources.

Acquiring and Maintaining a Cellphone

The instability of one's environment when experiencing homelessness brings to question the process of actually acquiring a mobile phone in their unique circumstances. Members of the homeless community are often stigmatized; however, about half of our participants had only experienced homelessness for less than a year. P4 acquired a smartphone before he lost his home and P2 was provided a phone by his family to be able to keep in touch. Other ways members of the homeless accumulate funds to acquire mobile phones are through social security retirement funds (P5), working periodically as a day laborer (P8), using welfare cards like EBT (electronic benefits card) (P7) or receiving money from their families (P8,10).

Figure 4. A participant's Electronic Benefits Card (EBT) used to distribute welfare payments through a magnetic card.

Maintenance of a phone reflects the adaptation to rapidly changing environments. The most popular plan was a pre-paid, month to month plan (P3,5,7,8,9). One participant was billed monthly for "unlimited text, talk and games" (P2). All but one plan included unlimited text and talk. Choice of carrier (Cricket) was largely dependent on its proximity to the vicinity or due to mistakes made with other carriers (P3,8,9).

Limited Guarantees in Infrastructure

The impermanent and nontraditional living conditions experienced by homeless persons yield an additional set of constraints on their interaction with mobile devices. For many of the participants in our study, the regular charging of their phones and other personal computing devices was a challenge due to the constant changes with their day-to-day living situation. Even those with temporary residence within the shelter were not provided outlets in their rooms forcing them to relocate to a common room within the lobby of the shelter. Our participants without any form of residence were further affected by these infrastructure limitations, resorting to charge their devices at such locations as Starbucks, or as P6 specified: "*any place I can find with an outlet*."

Lack of Security

Issues with mobile computing in their various living environments also became important within the context of security. P5 elaborates: "*I've had two phones stolen. That's what happens on the street. I drifted off to sleep, it was on my chest. When I woke up it wasn't there.*" Many participants expressed similar concerns and experiences with retaining possession of their devices. In addition to the threat of theft, participants also reported struggling to hold on to these material items in the face of a constantly changing residence, or lack thereof. P6 strongly identified with this, stating that he had lost his phone a few months back for uncertain reasons, and that he frequently loses things. P8 noted that the accompanying accessories for mobile devices were even more complicated to continually transfer around, sharing that he was unable to set up the voicemail greeting on his own mobile device due to losing the accompanying manual.

Mobile Phones for Mobile People

Several mentioned the necessity of being able to communicate, especially in the context of homelessness. P5 noted "*Communication is essential. I've been without a cell phone for various time periods within this period [of homelessness]. They've been stolen. ... The amount of help that they can be is substantial. [Cell phones are] a way to communicate with others to learn where resources are, when opportunities present themselves.*" Therefore, P5 points out the great help mobile phones can be in supporting someone going through a season of homelessness. Communication facilitates collaboration in finding out where resources are.

Since the homeless do not have a permanent address, P15 expressed the frustration over losing his food stamps after being unable to be contacted:

> P15: "I just lost my food stamps"
>
> Int: "Why?"
>
> P15: "I don't have a permanent address. So I didn't receive my forms that I needed to fill out in order to get food stamps. I didn't have a phone at the time either so my caseworker couldn't get a hold of me so I couldn't get my food stamps this year."

This was an illustration of a mobile phone being the second form of contact a caseworker resorts to when a permanent address is unavailable. However, due to the lack of a mobile address, P15 ended up losing his food stamps for the period of time.

Use
Motivation

The participants are primarily interested in contacting their family members and friends. Several participants indicated that calling and texting their family members is a way to catch up with the family while updating them about their lives. The act of contacting this group empowers the participants to seek for a better condition outside of the homeless life. For instance, P10 periodically calls his brother and through these calls, he expressed, "*I see how he faces troubles and it motivates me.*" Given that it is difficult to compete with other homeless to access the limited number of public computers, mobile phones are one of the better means for the homeless to keep in touch with their families and friends.

Access to Internet (Smartphones)

Two participants who had recently becomes homeless, P2 and P4, owned a smartphone. P2 owned it before he became homeless while P4 acquired it the second day after becoming homeless. P4 stated his reason for acquiring one was "*because it's trustworthy. You can't trust leaving a laptop around [here] and anyways, laptops have no internet.*" P2 echoed this sentiment, adding that public facilities open to rehabilitation members are often too crowded. This illustrates the perceived usefulness of smartphones as "all-in-one" devices. Not only do they provide security, in an environment where many are constantly on guard about their possessions, but they also provide the convenience of allowing them to access the Internet at any point in time. Smartphones are thus a better means to engage their perceived everyday needs, ranging from entertainment (P7), internet (P6,7,8) and information for their daily lives (P2,6,10). P10 mentions that even though his Internet is slow, he uses it to browse Craigslist to find employment.

Access to Assistance and Resources

Several participants stated that they use their mobile phones to access assistance and resources. For instance, P4 uses the phone to email his doctor to keep track of his health, since he is currently disabled from being overweight. He also regularly calls case workers to discern his status in the Medicaid process, voicing frustration that he could only leave voice mails and that the case workers "*never call back*". The insufficient support for the homeless provided by current mobile technology is further evidenced by the expressed reluctance of the homeless in using the mobile phones. P7 stated that one must go to the physical building rather than calling to acquire social services, such as obtaining an EBT, a welfare payment card. P2 lamented the lack of support by mobile technology in communicating with other homeless, since he must personally talk with other homeless to determine the locations of essential resources. There is thus a need for future designs to facilitate communication between the homeless and their support groups.

DISCUSSION

Our results introduce the idea that mobile phone use is active among the homeless community. P7 estimated that 90% of the homeless own a mobile phone and 50% own a smartphone. P6 mentioned the prevalence of mobile phones around him while living on the streets. These numbers may not necessarily be accurate, but they serve to illustrate the perceived mobile environment of the homeless community. Several participants stated that their peers are equipped with

a mobile phone. This perceived prevalence of mobile phones among the homeless helps validate the direction of using this technology with this community.

Therefore, the implications of our results are discussed below:

Variable Infrastructures

The variable contexts that occur across these communities hold important implications for future design work, especially as they related to cooperation with various infrastructures. For instance, many participants in our study faced the challenge of lacking regular access to electrical power, which introduced additional uncertainty in the reliability of accessing their mobile phones. The modern mobile phone design has seemingly settled on a certain bulk to battery life ratio that is useful only when there is steady access to electricity.

This lack of certainty that structures our participants phone charging habits carried over across other such contexts as device security in risky environments, where increased exposure to risks resulted in most participants being a victim of 1-2 mobile phone thefts. Physical environments also played a role, not only in lack of infrastructure, but also in rapidly evolving infrastructures and circumstances. As participants frequently move in and out of temporary housing facilities, many coped with phone and accessory loss as a result of their mobile lifestyle. Therefore, one should consider theft and essential accessories when designing mobile phones or systems for this community.

Future Interventions

Based on the findings, there are potential avenues to further empower the homeless utilizing existing communication habits between family and friends. There is a design opportunity in co-opting these networks to exist as micro support groups. P10 notes the hope it brings him to keep in contact with his family and this kind of moral support would be difficult to be delivered in the form of a government organization. Other support could be peer-to-peer, collaborating to gather resources they need or to share helpful information regarding the institutions (medical, social, welfare) they often interact with.

However, an important finding was that the homeless understand that mobile phones are not the end-all solution to their problems. Several participants elected against using their phones in urgent or important circumstance, instead choosing to visit Social Services or the health clinic in person to get the attention they need. Phones are limited in expressing things like urgency and therefore, should not be relied upon for important transactions between welfare, medical and social institutions with the homeless community. Rather, mobile phones might serve as a support system to augment interactions with these institutions.

Empowerment

Mobile phones allow for flexibility, freedom of communication, which contributes to a greater sense of autonomy. The low-cost and access to phones allowed peripheral interactions with family and friends formerly only available to those who could afford it.

Additionally, P5 maintains his hobby of photography using his camera phone. Though he now takes lower quality photos, the ubiquity and low cost of a camera phone creatively empowers P5 despite his circumstances. Therefore, the prevalence and low-cost nature of multifunctional mobile phones allows them to be co-opted for uses previously denied to those who could not afford expensive equipment, like cameras, empowering members of the homeless community.

Cell phones afford autonomy, flexibility and even creative empowerment, thus opening up opportunities for designing for and with the homeless community.

Unintended Consequences: Exploitation

Many participants experienced issues with social services where they received inconsistent information regarding assistive services meant for these communities. The lack of direct communication on resources and social service opportunities by broad-scale government and social organizations left gaps for mediation that were often filled by companies or groups in a position capable of exploiting these homeless communities. This problem was felt most plainly in the execution of the "Obama phone" cell phone opportunities. "Obama phone" is a nickname for the Federal Communication Commission's (FCC) Lifeline program, which aims to provide those under the poverty line with a free phone. Participants who had experienced homelessness for longer durations alluded to this program frequently. The gaps in information communication in this program left many participants curious and anxious, oftentimes unable to follow through in benefiting from the system due to the lack of cooperation in administrative and postal work from the residence shelter staff. Furthermore, these communication gaps allowed these communities to be made vulnerable and exploited via the prevalence of scams surrounding the term "Obama phone."

Therefore, though our paper supports the notion of distribution of free mobile phones to communities in need, there should be careful consideration of the administrative processes that help facilitate the intended goal. Vulnerable populations continue to be at risk to be further exploited through the misinformation surrounding programs like the Lifeline program. Frequent theft is another risk that should be kept in mind when developing mobile technologies for the community.

CONCLUSION

Our work is the latest to reexamine the rapidly evolving space of mobile phone use among the homeless adult community. Through qualitative interviews and analysis, we

illustrate several themes that manifest and structure mobile computing behaviors broadly across this population. Our findings lead us to believe that widely held perceptions of technology use in these communities should not be relied upon and that the current prevalence of mobile phone use indicates a promising opportunity for future innovation for empowerment.

We hope that this work spurs on further research in this area, to first attempt to understand motivations and behaviors surrounding mobile phone use before prescribing interventions or systems within vulnerable communities.

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