
HCI4D: HCI Challenges In The Global South

Marshini Chetty

Georgia Institute of Technology
85 5th Street NW
Atlanta, GA, 30322
marshini@cc.gatech.edu

Rebecca E. Grinter

Georgia Institute of Technology
85 5th Street NW
Atlanta, GA, 30322
beki@cc.gatech.edu

Abstract

While researchers have designed user-centered systems for the Global South, fewer have discussed the unique challenges facing HCI projects. In this paper, we describe methodological and practical challenges for HCI research and practice in the Global South.

Keywords

Global south, HCI, methodologies

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

ICTs for development (abbreviated as ICT4D) involves designing and deploying computer-based solutions for developing nations (also known as the Global South), and includes HCI [5, 6]. However, to date little is empirically known about what HCI4D (Human Computer Interaction for Development) means in practice: what does it take to conduct fieldwork, deploy solutions, and what consequences does it have for our methods? Using the experiences of an HCI4D project in rural South Africa, we present our work in progress to identify and understand the methodological differences between HCI and HCI4D.

Related work: HCI in the Global South

ICT4D has only emerged as a field of research in the last decade. During that time, projects have targeted variety of sectors namely education [10], microfinance [11], government [8], health [9] and so forth. While some projects succeed, other researchers describe difficulties in deploying systems. The challenges are surprisingly familiar: inappropriate interfaces, mismatches between the system and local community practices, and lack of locally relevant content [3, 4]. We believe that these problems, although occurring in a radically different context, resemble the difficulties that HCI research and practice have sought to address.

Other scholars have also observed this similarity and called for a need for HCI in the developing world [5, 6]. Further, a few researchers have undertaken HCI4D projects, which typically involved Participatory Design or related techniques. The results of these experiences lead commentators to suggest that HCI4D presents unique challenges for HCI research and practice [7]. We agree, and building on this, we seek to understand whether and, if so how, HCI methods have to be adapted for HCI4D. Next we briefly describe our HCI4D project, with a focus on the experiences of doing HCI, and the methodological consequences.

Case Study

The lead author undertook a project in two villages—Tsilitwa and Sulenkama—in the Eastern Cape (EC) province. The EC has many rural-poor areas, including our sites, where people live without reliable power, running water, roads, landline telephones, and have marginal access to healthcare and education. We chose these villages, because a national semi-private organization had previously installed an 802.11b

wireless network to connect various buildings in the two villages. This organization gave us access to their network and introduced us to the communities.

The research team had three members—one person from the EC who spoke Xhosa, the commonly-spoken language in the villages. Needless to say, he proved invaluable for building rapport. We used Action Research (AR) (a user-centered approach—similar to participatory design—that has been used in the developing world), to identify a problem to focus on [2, 12]. We made 6 field visits, between 1-3 months apart, starting in Aug 03 and ending in Oct 04. Each visit lasted 4-5 days and included team debriefing, where each researcher compared results for the day. We took extensive field notes.

Our first two visits focused on identifying a problem domain—using semi-structured interviews and questionnaires—and brainstorming possible solutions. We identified communications between the nurse at the clinic in Tsilitwa and the doctor at the hospital in Sulenkama as our focal point. Patients are poor and transportation is expensive and time consuming—thus reducing the need to travel through better communications about whether or not to refer patients from one site to another seemed beneficial. Further, a previous webcam and VoIP solution implemented between the clinic and the hospital had failed—due to the need for the network to be available constantly—a rarity given the power losses in this area.

Once we identified the problem, we used paper-prototyping methods and focus groups to explain and evaluate potential solutions with participants and community members. Since long-term computer use

was uncommon in this community, we used paper prototypes to reduce the barriers to getting feedback on our solution.

After evaluating our proposed solutions, we designed and implemented a software prototype. The prototype, called Multi-modal Telemedicine Intercommunicator (MuTI, a play on the Zulu word for traditional medicine) allowed the nurse at the clinic to send voice, text, and image data about patients to the hospital's doctor via the wireless network (using store-and-forward techniques) between the two sites. This communication allowed the nurse to get the doctor's advice on whether to refer patients to the hospital.

Subsequent field visits (numbers 3-5) were devoted to installing and testing different versions of the prototype (refined after each evaluation visit). During these evaluation visits, we conducted interviews and observed participants using our prototype. Additionally, we collected logs of system usage recorded by the prototype to compare actual versus perceived use.

Our project ended prematurely. Prior to the 5th field visit, the semi-private organization told us that they wanted to continue work on their own telemedicine communication system. Since our project potentially conflicted with theirs, they requested that we remove our system from their site. Although our participants were unhappy with the decision, we had to abide by the wishes of the owners of the wireless network.

We developed an exit strategy to carefully extricate ourselves and our equipment from the sites over the last two field visits without causing stress to our participants. Despite the early termination of our

project, and even with the good wishes of the community, by the end of visit 6, the clinic and hospital had lost the ability to contact each other.

Discussion: Doing HCI4D in the Global South

In this section, we discuss the experiences of HCI4D based on our project, and methodological implications for HCI research and practice in the Global South.

Ethics: Managing Stakeholders Expectations in HCI4D

The HCI community has a long history of considering ethics of research. Our experience suggests that HCI4D researchers also need to be mindful of the implications that the presence and potential loss of technology has on communities who have precious few resources.

When we removed MuTI, we took away a method of communication that the doctor and nurse enjoyed and found useful for work. Removing MuTI returned them to a system which they disliked, and further one that was subject to failure, which then forced the nurse to making a solo decision about whether patients needed to visit the hospital. Patients incurred more frequent instructions to make the long and costly journey. Simply put, HCI4D can make powerful positive changes to people's lives, but it can also return them to their previous state seemingly as quickly.

Planning: Infrastructure and the Process of HCI4D

The lack of infrastructure in the EC constrained our system design and our practice. Roads made system evaluation difficult; traveling between sites for testing took at least an hour. Frequent electrical failures meant training sessions had to be held wherever electricity was available in the village, and if this was not possible, we had to wait until power was restored.

Another conspicuously absent infrastructure was a base of computing knowledge. This complicated our project in three ways. First, it changed the training we had to provide to include both basic computing and application use.

Second, the lack of expertise in network administration meant that each time the wireless network failed, it stayed down until a network administrator fixed it. This required calling the administrator—also difficult due to the lack of telecommunications infrastructure and the high cost of mobile calls.

Third, the lack of computing familiarity made it hard to find people who could evaluate our system on technical and fit-to-work criteria. We relied on two users, the only two people who understood the computer and the healthcare work to assess our system.

A final challenge came from the high rates of violent crime that our study settings were experiencing. The safety of the research team was a primary concern, but safety conflicted with our ability to work. It constrained our hours of operation—to daylight—and meant that we spent nights away from the site—despite travel costs.

Although we are not currently aware of literature that discusses physical safety threats doing HCI or HCI4D research, this was a huge consideration in our plans. More generally, we would argue that HCI4D methods must account for the practical consequences of working in insecure environments. While it may be suboptimal to conduct user tests outside the “workplace” setting, in practice it may be the only option. Further, evaluation of HCI4D research needs to accommodate these

choices that while not ideal, balance HCI with difficulties of working in this context.

Techniques: HCI4D Practice

We experienced a variety of challenges with the techniques we used to elicit data and evaluate our system. First, and foremost, our participants’ lack of experience with computers made it hard for them to co-design interfaces. Explaining our designs required setting much greater computing context than it would in the developed world. Our participants found it hard to explain their feedback to us—in ways we understood.

Based on experiences in the developed world, we expected comments about the system that would easily translate into design changes. Yet, in one-on-one sessions, participants took some encouragement to express ideas, and when they did we had to work hard to see how to resolve the issues that they identified. We found that focus groups worked better for systems feedback elicitation. The focus groups allowed our participants to build on one another’s ideas, adding their knowledge to the suggestion under discussion.

Another challenge we encountered turned on our participants’ beliefs about what constitutes appropriate criticism. For example, when we asked about potential concerns with our interface, our participants sometimes did not want to criticize us, in fear that we would view it as impolite. This makes some techniques, like a think aloud—which would have been very useful for parts of this project—difficult to implement.

These two examples speak to the practical problems of HCI4D. However, they also speak to the relationship between culture and practice. HCI techniques have

largely developed in a culture where the offering of criticism has perceived value—"constructive criticism." However, taking methods imbued with the cultural values of the developed world, into the developing one, risks cultural collision where different values render the methods less useful at best and insensitive at worst. Again, we would argue that this speaks to an opportunity to think about not just the values incorporated into the systems we design, but into the processes we have created.

Culture: Revisiting Anthropology

During this project, we found ourselves reminded of one of the historical origins of the methods we used: anthropology. Our practice reminded us as much of accounts of anthropological fieldwork, as it did accounts of HCI research. Specifically, anthropologists have a long history of researching cultures very different from their own. By contrast, ethnographers in the HCI tradition have evolved a set of techniques such as defamiliarization [1], to help them interpret aspects of users' culture that the researcher might also share. This cultural divide may exist because HCI research and practice has been largely built for and by those in the developed world.

Our project team was composed of three South Africans, but only one shared the cultural context of the community we worked with. Our local expert proved invaluable in helping us understand aspects of community life. However, we still needed to spend considerable time learning about the culture itself, in order to make sense of the role that the system might and could play, and to increase the chances of it being adopted.

For example, one aspect of culture we had to learn was how the tribal and governmental aspects of the community resolved themselves in decision-making. In addition to the local and national systems of governance, both Sulenkama and Tsilitwa also had a tribal council lead by a headsman. First, we had to learn that this type of governance existed, and that it had no formal decision-making responsibility. However, it was clear from our observations that the headsman—who had inherited this position based on his ancestral heritage—was a highly respected member of the community and that his words influenced the community. Therefore, we met with him as early on in the project as we could to inform him about our initiative, and to seek his endorsement.

While this example serves to illustrate aspects of this particular culture, what we wish to draw out here, is the work it takes to understand the "users context." So, while it was perhaps easier for us to defamiliarize in this setting, it was much more difficult for the researchers to figure out what the sources of some of the cultural differences we experienced were, and how they would interact with our system design and its use.

As a minimum we would suggest that HCI4D researchers account for this type of learning, since it took time but was essential. However, we also see this as a potential opportunity to draw on anthropology yet again. Previously, we have drawn on anthropological approaches to data collection and analysis. In HCI4D, we see the possibilities of learning from the foundations of anthropological practice and theory, in ways that help us to understand the cultures that we seek to change through the deployment of usable and useful systems.

Conclusions: The HCI4D Future

In this paper, we discussed the methodological implications of conducting HCI research in the Global South based on our project in rural South Africa. The project ended earlier than we would have liked but we succeeded in that we achieved our goal of coming to a deeper understanding of the challenges of HCI4D. Full results will be presented in future work.

In our discussion we have highlighted some of the differences between HCI in the developed world and HCI for the developing one. We believe that recognizing and working with these differences is essential for building useable and useful systems in the Global South. HCI, as discipline borne in the developed world, has much to offer the developing world. We offer this experience as a start of understanding the methodological and practical challenges of HCI4D. We also hope to begin building a community of HCI4D researchers within HCI, who seek to extend our field through the development of both methods and systems designed for the Global South.

References

- [1] Bell, G., M. Blythe, and P. Sengers, Making by Making Strange: Defamiliarization and the Design of Domestic Technologies. *Transactions on Computer-Human Interaction*, 2005. 12(2): p. 149-173.
- [2] Blake, E.H. Extended Abstract: A Field Computer For Animal Trackers. in *CHI '02: CHI '02 extended abstracts on Human factors in computing systems*. 2002. Minneapolis, Minnesota, USA: ACM Press.
- [3] Brewer, E., et al., The Case for Technology in Developing Regions. *IEEE Computer*, 2005. 38(6): p. 25-36.
- [4] Brewer, E., et al., The Challenges of Technology Research for Developing Regions. *IEEE Pervasive Computing*, 2006. 5(2): p. 15-23.
- [5] Cogburn, D., HCI In The So-Called Developing World: What's In It For Everyone. *Interactions*, 2003. 10(2): p. 80-87.
- [6] Dray, S.M., D.A. Siegel, and P. Kotze, Indra's Net: HCI In The Developing World. *Interactions*, 2003. 10(2): p. 28-37.
- [7] Elovaara, P., F.T. Igira, and C. Mortberg Whose participation? whose knowledge?: exploring PD in Tanzania-Zanzibar and Sweden in *Proceedings of the ninth conference on Participatory design: Expanding boundaries in design - Volume 1 2006*. Trento, Italy: ACM Press.
- [8] Kumar, R. and M.L. Best, Impact and Sustainability of E-Government Services in Developing Countries: Lessons Learned from Tamil Nadu, India. *The Information Society*, 2006. 22(1).
- [9] Martinez, A., et al., Analysis of information and communication needs in rural primary health care in developing countries. *IEEE Trans Inf Technol Biomed.* , 2005. 9(1): p. 66-72.
- [10] Pal, J., et al. The case for multi-user design for computer aided learning in developing regions. in *15th International WWW Conference*. 2006. Edinburgh.
- [11] Parikh, T.S., et al. Mobile phones and paper documents: evaluating a new approach for capturing microfinance data in rural India in *Proceedings of the SIGCHI conference on Human Factors in computing systems*. 2006. Montreal, Canada: ACM Press.
- [12] Puri, S.K., et al., Contextuality of participation in IS design: a developing country perspective, in *Proceedings of the eighth conference on Participatory design: Artful integration: interweaving media, materials and practices - Volume 1*. 2004, ACM Press: Toronto, Ontario, Canada.