



## From the Guest Editors

### *Human-Computer Interaction for Development: Mapping the Terrain*

Niall Winters & Kentaro Toyama

#### Introduction

Research explicitly focused on the role of Human-Computer Interaction in International Development has been an area of increasing interest over the past 10 years. For example, in 2003, there was a special issue of ACM *interactions* on HCI in the developing world (Dray, Siegel, & Kotzé, 2003). This was followed by a series of workshops at major international conferences (e.g., INTERACT '07/'09, CHI '07/'08/'09, HCI '07, DIS '08, PCF5) over the decade. Indeed, it was at the CHI '08 workshop that the seeds for this special issue were sown. Given the progress which had been made, including the formation of the IFIP TC13 Special Interest Group on Interaction Design for International Development, the participants felt that the time was right to reflect on both the lessons learned and where Human-Computer Interaction for Development (HCI4D) currently stands. That reflection, presented in this issue, is framed along three axes:

- Outline the interdisciplinary nature of the area
- Delineate the relationship between HCI4D and ICT4D
- Discuss the epistemological and methodological foundations of the area

ICT4D and HCI, by their natures, are interdisciplinary areas of research and practice. This presents both an opportunity and a challenge. The opportunity is to benefit from what each involved discipline brings to the table; the challenge lies in overcoming significant disciplinary boundaries, the impact of which cannot be overestimated. Best and Bar (2009) detail extreme positions, where computer scientists privilege technical innovation, but social scientists criticize techno-centricism. In such a climate, HCI4D is doomed to failure. However, all is not lost, as interdisciplinarity is fundamental to an increasing number of research areas. In the UK, for example, cross-research council funding of £12m (~€13.5m, ~US\$20m) was specifically targeted for interdisciplinary research in education.<sup>1</sup> This raises the question as to how disciplinary silos were expected to be overcome: The answer, in short, was to innovate in *both* the technical and social sciences, focusing on the integration of research perspectives to address “complex research questions that are challenging enough to need high-level innovation from a *combination* of such disciplines.” As researchers, we are called on to expose ourselves to the “concepts, ideas and methodologies of other disciplines” that may yield a change in the way we see our own discipline. It is in this spirit that we offer this special issue.

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1. See [http://www.tlrp.org/manage/documents/TLRP%20Secondcall%20\(FINAL\).pdf](http://www.tlrp.org/manage/documents/TLRP%20Secondcall%20(FINAL).pdf)

## Background: Human-Computer Interaction for Development

Technology has always played a part in human development, but recent advances in computing devices, wireless technologies, and the Internet have come to the fore as potential facilitators for global development (Kleine & Unwin, 2009; Heeks, 2008). As researchers and practitioners working in the field of Information and Communication Technologies for Development (ICT4D), our motivation is to see technology directly benefit marginalized communities around the world. The following scenario is representative of the work in which we are engaged:

*Rashid is a veterinarian working in Arusha, Northern Tanzania. He has 20 vet assistants who work directly with rural farmers. The main challenge he faces on a daily basis is the detection, identification, and management of infectious diseases among rural livestock. He has recently begun to produce short video clips on disease identification, and his assistants use these on their farm visits to help local farmers with early warning detection. Rashid has also installed a software application on his phone that both records field data submitted via SMS by his assistants, and also provides data analysis tools. Based on his analysis, Rashid identifies which topics are critical to his vet assistants right now. He uses this to help him decide what new audio and video content to develop, thus producing context-specific educational resources.*

The cycle of iterative design, development, and implementation of such solutions is nontrivial, because it requires an interdisciplinary approach to the problem. It is not enough to understand the issues from a technical point of view; researchers and practitioners must work together to come to a common understanding of the context in which they are working, a context that usually involves technical, social, political, and economic elements, in addition to the domain-specific ones necessary to work in, say, veterinary medicine. In addition, the needs of stakeholders—local organizations, researchers, domain experts, and end-users—may not always be aligned.

The emerging area of HCI4D directly addresses the above concerns. It focuses on the wider issues of designing, developing, and deploying technologies in developing regions, placing socio-cultural aspects at the core of study. HCI4D challenges original visions of how any intervention might work by grounding them in real-world use. The reason for doing this is to develop authentic and thick descriptions of users' needs, paying particular attention to the social and physical constraints that are encountered. Interventions are thus iteratively developed through a constant process of communication and evaluation with partners (Luckin et al., 2006). This approach builds on the general shift in HCI research over the past two decades to an increased focus on the human experience, moving away from what computers can do and closer to what users can do (Shneiderman, 2002).

It is important that we conceptualize our understanding of HCI4D at two levels: (1) its relationship to ICT4D, and (2) its epistemological and methodological underpinnings.

### The Relationship Between HCI4D and ICT4D

One question that is often asked is: How is HCI4D research different from ICT4D research? We believe this question is ill-posed. Instead, the question should be: How can and does HCI contribute to ICT4D? It does so not by attempting to establish itself as a new field, but by bringing HCI issues to the forefront within the continuum of ICT4D research. This contribution is still emerging, but it is useful to delineate its characteristics. We begin with the key "identifying features" of research in ICT4D, as proposed by Burrell and Toyama (2009), and then we drill down into them from an HCI perspective. Two features are particularly relevant, as they both deal with issues related to the *nature of interaction*: (a) between people and technology, and (b) between researchers and the community with which they are engaging.

Referring to point (a), given HCI4D's focus on design, it is not surprising that many HCI4D projects investigate interactions around new and innovative technological interventions. However, this is not always the case. Marsden (2008), for example, calls for "less focus on innovation," and more on studying interactions with widely available technologies—particularly mobile phones. He focuses on supporting "empowered design," where the "design goal in building any system is that it *empowers the end users to modify it to fit their own needs*" (italics added). This concern with re-purposing and modification to support usage mirrors research within the technology-enhanced learning community on how technology is incorporated into practice. For example, Sharpe and Oliver (2007) have produced five key principles and a typology for effective intervention, framing the wider context of interaction.

Referring to point (b), Burrell and Toyama (2009) note that research "often entails considering and interacting directly with people in a socioeconomic strata quite different from our own and in distant locales," a process that implies coming to terms with the differences encountered. For HCI4D, such interactions are often within the context of an iterative design process, raising the potential for ongoing tension when people outside a community are involved in designing for that community. While this is a problem the HCI community has faced, in ICT4D these issues are heightened due to cultural differences, wealth differences, geographic differences, etc., each of which further contributes to an overall anthropological challenge of truly understanding "the other" in the process of design. If participatory methods are used, care must be taken with their implementation (Heeks, 1999; Kolko & Rose, 2007; Dearden & Rizvi, 2008).

## **Epistemological and Methodological Considerations**

While HCI4D inherits the richness and interdisciplinary approach of its "parent disciplines" HCI and ICT4D, this brings with it certain epistemological and methodological complexities and tensions. This is common in any area that reflects a range of backgrounds, particularly those that attempt to translate research into practice. Educational research, for example, has been criticized for not following the scientific model. However, as Pring notes, "the distinctive features of any enquiry are determined by the nature of the subject matter to be enquired into" (2004, p. 7). Thus, it is not surprising that we find similar debates in both the HCI and ICT4D fields. Two examples will suffice. Within the HCI community, the variety of epistemological positions held by HCI practitioners has led to fruitful discussions about their impact on practice. For example, Greenberg and Buxton (2008) have questioned the post-positivist stance currently prevalent in usability evaluation (evidenced by the many papers using laboratory-based user observations and controlled user studies). They argue that evaluation should, where appropriate, "be open to other non-empirical methods" (ibid.).

ICT4D research also exhibits similar debates and tensions. These encompass differing epistemological positions, from realist to interpretivist views, a polarity characterized by Burrell and Toyama (2009) as "problems vs. values." A problem-solving-first approach places primary importance on an intervention showing "measurable improvements" (ibid.), whereas a values-first approach argues for the joint construction of a "shared perspective between researchers and the communities they research" (ibid.). HCI4D researchers must be open to, and honest about, the different ideologies present in the area, and they must bring extra sensitivity and care to their research designs, so as to reflect their sometimes nuanced positioning.

## Articles in This Issue

The call for this special issue on HCI for International Development was published in the summer of 2008. Fifteen papers were received; ten went into the first round, with eight being finally accepted after a double-blind review process.

The eight pieces in this issue represent a broad range of topics and areas. As editors, we felt it was important to reflect the range of research going on in the emerging HCI4D field. We also wanted to provide an opportunity for new and early career researchers, who are often those working directly in the field, to present their work. We are particularly glad that so many chose to do so. You will have the opportunity here to peruse the work of all 30 authors who contributed to this issue.

The first article, from Ho et al., provides some historical background to the field, noting the major themes of participation, the relationship between research and practice, and evaluation. Any such survey can be faulted for having made contestable decisions (both intentionally and unintentionally) about what work to include, what to emphasize, and what to leave out; but in any case, the article provides a broad narrative of the history of the field that touches on most of the major streams of work in HCI4D. They end their paper by calling for the community to address longer-term challenges, including developing deeper conceptual understanding, building knowledge more cumulatively, and demonstrating “compelling benefits to developmental goals.”

Challenges are also on the mind of Donaldson, who has little experience with ICT4D itself, but extensive experience with designing interventions in development. In her forum piece, she asks the community to take a step back and reflect on their own position: What are our goals? How can impacts be sustained? Perhaps most relevant to this issue, she asks if “remote design” is even appropriate or possible. This goes to the heart of many HCI4D projects (certainly those involving the academic community in developed countries), where the reality of project funding requires that researchers sometimes fall back on remote design.

This specific issue is addressed by Putnam et al. in their unconventional paper. They point out that, while personas and scenarios are useful tools for the communication of data to designers by researchers using user-centred design methodologies, they require intensive data collection and onsite fieldwork. When this is not feasible, Putnam et al. suggest using data from previous studies. In their case, the aim was to develop personas and scenarios for mobile phone users in Kyrgyzstan. They analyzed survey data, previously collected in Kyrgyzstan, on attitudes and behaviors associated with technology use, and along with focus group data on how mobile phones support social networks, they managed to construct their personas and scenarios remotely. We suspect that this secondary data usage will be a point of controversy among readers, and we welcome any ensuing dialog.

It has become almost cliché to note that mobile phones have been one of the world’s most successful technologies, even among the poor in developing regions. It is, therefore, not surprising that many HCI4D researchers are working with this technology. Frohlich et al. discuss the StoryBank project, which examines the type of access and form of content suitable for the majority of rural Indian users. Their solution is an application that supports the production of six still images and a two-minute voiceover. These digital stories are sharable with the community via a StoryBank repository. Their results show how StoryBank provides “semi-literate communities [with] a new voice by which to express themselves.”

Literacy is a key theme in HCI4D. Sherwani et al. propose that the literacy of the end user is significantly different in a development context from traditional HCI scholarship, and therefore, the

assumptions underlying existing HCI methodologies do not hold true in HCI4D. Drawing upon orality theory, which conceptualizes oral cultures, they propose a framework for oral users in support of recommendations for user interface design, arguing that current methodologies must be adapted for use in oral cultures.

In his forum piece, Parmar, too, supports user-centered methods in HCI4D. He argues for a multidisciplinary approach to the design of ICT interventions and builds on existing approaches to propose a holistic framework for design practice explicitly informed by theory.

HCI4D designers sometimes don't have enough knowledge of the people and contexts for whom they are designing. Patterson, Sim, and Aiyelokun explicitly address this issue of distance—both cultural and geographic—in their paper. They discuss their experience of arriving in the field to find that, despite their preparations, the situation was markedly different from their expectations, resulting in design blind spots. They detail design lessons useful to those of us who may find ourselves in a similar situation.

The issue ends with a note from the field: *Reflections on HCI4D Experiences*, which is sure to draw nods from readers. Anokwa et al. describe their pragmatic experiences of working in the field to produce a set of lessons learned for their fellow fieldworkers. For the community, they discuss “the relationship between researcher and user, the need to manage expectations and reputations, and the meaning of participation.”

## Looking to the Future: HCI4D in *ITID*

*ITID* has always been interested in publishing HCI4D papers, and as such, it is uniquely positioned to play a key role in communicating, debating, and sharing our emerging research. As exemplified by this special issue, HCI4D has much to contribute to the ICT4D community. Certainly, exciting and stimulating challenges lie ahead as we grapple with the interdisciplinary nature of the area. Making a contribution to both technical and social science is a significant challenge, but we believe that the long-term benefits of doing so far outweigh the immediate hurdles we face. HCI4D is a step in this direction, and we hope that this issue will boost *ITID* as a potential outlet for future HCI4D research publications.

We would like to end by thanking all the authors who submitted their work for consideration; the reviewers for their efforts over the course of many months; and the *ITID* team, the Editors-in-Chief and Managing Editor Arlene Luck, for their time and dedication. It certainly made our experience of guest-editing both academically and personally rewarding. Please enjoy this issue!

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