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# Human-centered Computing in International Development

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**Abstract**

This workshop continues the dialog on exploring the challenges in applying, extending, and inventing appropriate methods and contributions of Human-centered Computing (HCC) to International economic and community development, borne out of tremendously successful HCI4D workshops at CHI 2007 and 2008. The workshop aims at 1) providing a platform to discuss interaction design practices that allow for meaningful embedding of interactive systems in the cultural, infrastructural, and political settings where they will be used 2) addressing interaction design issues in developing regions, as well as areas in the developed world marginalized by poverty or other barriers. We hope to continue to extend the boundaries of the field of Human-centered Computing (HCC) by spurring on more discussion on how existing methods and practices can be adapted/modified, and how new practices be developed, to combat the unique challenges posed by this context.

**Keywords**

User-centered Design, Human-centered Computing, International development, Sustainability, Values

**ACM Classification Keywords**

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

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**Introduction**

From Kansas City to Kigali, Information and Communication Technologies (ICTs) have evolved to reach wider audiences in the past few decades, resulting in changes in goals, context, and target groups, as well as ethical contexts. This leads us to ask the critical question of who we are designing for, how, and why. On the one hand, interactive applications have permanently affected the field of Human-computer Interaction, whose concerns were traditionally cognitive. On the other hand, interactive systems are increasingly taken up in the developing world, both by richer urban elites and growing middle classes, and by urban and rural users in more economically marginal areas. These situations involve very different contexts of use, and demand new design solutions. In designing for inclusivity, these ICT tools are of value to the end-user only if they are made relevant. More than ever, therefore, it is important, to cultivate design practices that allow for meaningful embedding of interactive systems in the cultural, infrastructural, and political settings where they will be used.

The workshop continues the dialog borne out of a series of immensely successful Human-computer Interaction for Development (HCI4D) workshops at CHI 2007 (50+ participants), DIS 2008 (20 participants), and CHI 2008 (35+ participants), that brought together the International Economic and Community Development and the Human-computer Interaction (HCI) communities to support mutual learning and sharing and to explore ways to integrate these approaches to increase chances for success of projects seeking to use ICTs for Development (ICT4D). Although it can be argued that existing HCI techniques should always be used for system engineering, the approach is particularly crucial

(1) when there is a large discrepancy in the background knowledge and assumptions of end users on the one hand and the designers/developers on the other, and/or (2) where there is no prior experience in developing systems for new situations. This is often the case for ICT4D projects. Thus, we feel Human-centered Computing (HCC) may prove invaluable in designing systems for so-called developing countries.

**Human-centered Computing**

The cornerstone of good interaction design is sensitivity to the user and context. However, in international development projects, that are fraught with infrastructural, economic, cultural, political, and policy hurdles, it is also crucial to continually question implicit design assumptions in design decisions. To cope with these unique challenges, we must examine many established as well as unexplored areas in HCI to allow us to most effectively understand the users, their communities, practices by understanding socio-cultural and economic differences. By bringing together the communities of HCI, International Development, Social Sciences, Public policy, Computer Science, Education, Economics, and Healthcare, we hope to address the multiple dimensions of these problems and to engage in what we hope will be a multidisciplinary discussion.

The above issues are further compounded by the fact that many recipients and users of ICT have little or no computing experience, low literacy levels, and that there exist profound differences in social and cultural norms between the designer and user, in addition to resource constraints. All of these things will form the basis of the workshop discussions.

In addition, we must re-examine the following established HCI areas and identify how to apply them in

the challenging contexts of HCI4D projects. Specifically, (1) User Research - Contextual research is essential in establishing design requirements and goals of the system. We need to discuss how to do this type of research in culturally appropriate and ethical ways, and how to apply our findings to ICT development in a timely manner. (2) User Interfaces (UIs): UIs have to be designed for low-literate and illiterate users, provide for easy learnability, and explore interaction metaphors familiar to the target user group. Western metaphors for UIs, such as the desktop metaphor, should not be expected to apply to the cultural and social realms of other user groups. Locally-relevant content and appropriate visualizations should be created. (3) Evaluation Techniques - Multi-dimensional evaluations for different contexts should be created. Long term evaluations can be especially challenging. Metrics should accommodate socio-cultural, educational and economic differences.

### **Broader issues to be addressed**

In addition to the above-mentioned issues, the following broader issues need to be considered to ensure success of an ICT4D project. These include:

**Cultural disparities:** Most computing technologies currently standardize practices across different cultures; promoting particular ways of interacting at the expense of erasing other ways; and supporting the emergence of a dominant *lingua franca* – namely English. The cultural differences in various contexts form a challenging but compelling design agenda for HCI researchers – how, and to what extent, can we preserve the local culture in technologies to create relevant and sustainable applications? How should HCI methodologies be modified in designing for other cultures? As HCI researchers, we

must act as interpreters, bridging the gap between the needs and values of native cultures and force of globalization, by listening and not imposing.

**Sustainability:** To ensure the continued success, ICT4D projects should be made sustainable. Applications should be made financially sustainable and fit into existing cultural practices, for adaption and adoption. In addition, systems should be made environmentally sustainable. This may require building in mechanisms for re-cycling e-waste during disposal or upgrades, situating kiosks close to bus-stops, and so on so that these systems fit within existing infrastructures.

**Values and worth:** Designers should recognize that values are inherently built into systems, whether deliberately or not. Ethics, business value, social value, and progressive thinking need to be considered. User research can help ensure that systems embrace existing values and not try to counter them. “Worth” is perhaps the most important criterion for adoption. Unless technology is not “valuable” – whether that be financially or by some other culturally-relevant measure, chances are that it will not be adopted.

**Design for deployment:** In designing for the developing world, systems have to function well outside of research labs and controlled conditions. Conditions that affect the successful functioning of the system are different or non-existent in the so-called “developing” world. Technology should be designed to be easy to deploy and tested for failure in harsh environments with little or no “technical support.”

**Capacity building and distribution of expertise:** Local people should be trained in usage and repair of the

systems. Especially in the case of large-scale deployment, it is not practical for the application developer or support to provide immediate assistance, given the problems due to transportation or lack of other resources. Appropriate publicity should be provided to persuade people to use the systems, through public demonstrations, media, word-of-mouth, and other mechanisms. Community understanding and support is critical at every stage of design, development and deployment.

### **Moving Forward**

Based on the feedback that we received from our previous workshops, we have worked on several initiatives. We recently hosted a website, to provide a platform for exchange of information, ideas, and experiences, for those in research, practice and education of HCI4D, <http://hci4d.org>. We have also annotated a bibliography to collect publications in the field of HCI4D, commonly pooled by the researchers in the community. We are also working on an story-base template, that will provide a means to report stories, findings, and observations for searching and sharing easily, as an online repository. In addition, we administer a highly-active mailing list, currently subscribed by 92 members, to discuss interaction design research in the realm of ICT4D, <http://groups.google.com/group/hci4d/>, as well as a grad student seminar mailing list. Finally, the feedback collected from our previous workshops will serve in guiding the design of this workshop.

### **Goals of the workshop**

The goal of the workshop is to provide a common vocabulary for the fields of ICT4D and Human-centered Computing. By bringing together a diverse array of researchers and practitioners, this workshop will offer an

opportunity to exchange success/failure stories, methodologies, and best practices, to develop new partnerships, and to learn from each other. The workshop is open to anyone in the fields of Human-computer Interaction, International Development, Social Sciences, Public policy, Computer Science, Education, Economics, and Healthcare who is interested in contributing to this dialog. Through the inter-disciplinary nature of the workshop, we hope to promote interaction design research, practice and education to address the needs, desires and aspirations of people around the world, especially those in the developing world.

The workshop is structured as a two-day workshop to provide room for presentations and discussions about ongoing and planned HCI4D research projects on the first day, and strategic planning on the second. We will use this workshop to extend and build an international community of engaged scholars and thoughtful practitioners who can bridge between disciplines and boundaries to create appropriate, effective and sustainable community development solutions.

### **Contribution to the HCI community**

Meaningful embedding of interactive systems in cultural settings is a fundamental concern of HCI. By sharing case studies and accounts of lessons learned, we will reflect on theoretical and methodological questions that arise when working across different cultures, values, languages, and infrastructures. By providing a space for reflection on sensitivity when cultural and technical understandings differ, we hope to contribute to HCI4D as well as the critical concern of HCI – *design for all*.

**Background and Topic of Workshop**

A growing body of academic researchers are looking into not only whether computers have succeeded in benefiting the poor in developing regions, but specifically how new computing systems can be designed, from a human-centered standpoint, to improve the livelihoods of the disadvantaged. As researchers in this area, we are multidisciplinary in new ways – drawing on backgrounds in international development, public health, education, and many other fields. This workshop is our opportunity to gather together explicitly as a community to share experiences, and support mutual learning. The design of this workshop is based on feedback from the 2007 and 2008 workshops, and collaborative feedback from the mailing list and graduate student seminar.

**Human-Centered Computing in International Development**

In international development, external factors like government policy, infrastructure, and language or literacy can be critical to the success or failure of a particular design. Understanding the user entails not only understanding them in terms of their use of the system but understanding them in terms of their communities, their practices, their cultural and socio-economics. As researchers we must also work in profoundly different cultural contexts, design for sustainability, select and build partnerships with local agencies, work with constrained resources, and learn to balance the values and needs of our target communities with the requirements of our own research. This workshop will offer a space further develop a community in which we can support exploration and research in human-centered computing in international development. It will be open to anyone with experience

or interest in HCI for international development or other underserved communities in which researchers may face similar struggles.

**Recruiting and Participant Selection**

We will seek to attract a mix of practitioners engaged in development projects, and experienced designers who wish to learn more, engaging both researchers working outside of their native cultural domain as well as researchers from universities based in developing regions. To encourage and support this diversity, we are seeking outside funding to support their travel costs and workshop fees. We will select participants based on two-four page position papers based on these topics. Our goal is to foster productive discussion and encourage collaboration within the group around high-level activities and in specific collaborative research projects. We hope to construct a workshop in which the participants will have a wide variety of interests, backgrounds, and experiences in terms of methods, types of systems, and the origins of their work.

**Structure of the workshop**

Based on the position papers, we will select two or three workshop participants to share their insights as pertains to the below-mentioned topics. These participants will be selected to present perhaps complementary viewpoints that will provide material for more discussion between other workshop participants. The workshop will be organized as a two-day event, with day one focusing on progress and experiences, and day two on logistics and action items.

**After the Workshop**

The immediate output of the position papers will be concrete proposals for how we can move forward in

collaboration in the community, as well as written ideas on how to address the issues we struggle with. After the workshop, we will publish some articles in the special HCI4D issue of ITID journal, ACM Interactions, Interfaces magazine, and report on Usability News. These workshops have already created our international community of HCI4D researchers, and we hope to continue to use this platform to grow and learn.

### About the Organizers

**Nithya Sambasivan** (point of contact) is a Ph.D. student in the Department of Informatics at the University of California, Irvine. She has a Master's in HCI from Georgia Tech. Her research interests include HCI4D, ubiquitous computing, and sustainability.

**Melissa Ho** is a Ph.D. candidate in the School of Information at University of California, Berkeley. Recipient of the 2008 Yamashita Foundations for Change Prize, she is currently investigating how the introduction of mobile phone-based forms changes formal and informal social processes around health information management in Uganda.

**Matthew Kam** is a Ph.D. candidate from the University of California, Berkeley with a background in economics, education, and computer science. His Ph.D. dissertation investigates how e-learning games on cellphones can impart literacy in a "power language" to rural children in developing nations. Starting Jan. 2009, Matthew will join the HCI Institute at Carnegie Mellon University as Assistant Professor.

**Neesha Kodagoda** is Ph.D. student at Middlesex University, UK supervised by Professor William Wong and Dr Nawaz Khan. Her research is on improving

information systems and information visualization that would assist & motivate low-literacy adults in information search and retrieval.

**Susan Dray** is a consultant with Dray & Associates, Inc. and has worked with professionals in so-called "developing" countries in employing UCD in economic development projects. She was awarded the CHI Lifetime Service award in 2006.

**Ann Light** is chair of trustees for The Fiankoma Project, a charity promoting cultural exchange through ICT by linking people in the UK and Ghana. She is a research fellow at QMUL, exploring people's understanding of and response to digital networks to inform interactive systems design, in Chile, India and the UK. Ann is also editor of UsabilityNews.com.

**John C. Thomas** is a Research Staff Member at IBM's T. J. Watson Research. He has worked in HCI for 30 years and has over 150 papers, book chapters, and invited presentations. He has also served as Workshop Chair and general Co-Chair for CHI and co-organized and co-lead more than a dozen workshops at CHI, CSCW, and ECSCW including two on cross-cultural issues in HCI.

**Kentaro Toyama** is assistant managing director of Microsoft Research India (MSR India), which opened in Bangalore in January, 2005; he played a critical role in establishing the lab and is responsible for helping guide its direction and growth. In addition to his responsibilities to MSR India overall, Kentaro leads the Technology for Emerging Markets research group as a principal researcher, and is a co-founder of the IEEE/ACM International Conference on Information and Communication Technologies and Development (ICTD).