

Understanding our Knowledge Gaps: Or, Do we have an ICT4D field? And do we want one?

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Recent discussions, either at already concluded ICT4D conferences and workshops, or here at the Harvard Forum, or in the planning discussions for future conferences, have reminded us of the sometimes strong and often unhelpful disciplinary walls that can be constructed across ICT4D's cross-disciplinary areas and the common tendency for this field to intellectually jog-in-place. Here's that story.

Some of us were at the recent ICTD 2009 conference in Doha, Qatar, certainly one of the biggest and most robust peer-reviewed academic conferences in the ICT4D space. And, in full disclosure, I sit on its advisory board so I've been following with keen interest a proposal to co-locate with next year's ICTD meeting, to be held at Royal Holloway in London, a more technical and more computer science-focused conference.

In August of this year, Tapan Parikh, a faculty member at UC Berkley, co-organized a workshop on Computer Science and Global Development in Berkeley, California. That workshop was supported with NSF funds and tasked with providing strategic vision to, and mobilization of, the computing research community around ICT4D themes. The main questions of this workshop could be summarized thusly: Is ICT4D work ?real?

- computer science? How can we raise the profile of this work within traditional CS departments? How can we get

To the last question, the response was a ?yes? and a structure was mooted, namely an ACM Special Interest Group (SIG) to cover the ICT4D intellectual space.* The Association of Computing Machinery ? or ACM ?

“ is the world's oldest computing professional society and work is currently underway to secure ACM sanction for

All three of these activities (ICTD2009 in Doha, the NSF supported workshop in Berkley, and the proposed ACM SIG's co-located conference at ICTD2010 in London) serve to remind us how fractured our intellectual community can be between the social sciences and engineering, policy makers and the legal community, practitioners and researchers, and in my opinion, how perilous this split has become.

So here are some of the things that I've heard from these meetings

? In Doha, the computer scientists felt that the conference overly privileged social scientists work and, for their part, the social scientists complained that the technical work lacked sophistication, was weak in evaluation, and was not grounded in the needs and realities of the users. A common story that I would hear from the social scientists is the computer scientists would get up and say ?I decided to build this thing. So I worked on this thing. Then I worked a bit more on the thing, then I adjusted the thing, and then the thing was done. Then I took my thing to Ghana and asked ten people whether they liked my thing. Nine people liked my thing.€ Hoorah for my thing.?

? In the Berkeley workshop, which was made up almost entirely of computer scientists (and I should add for

those who do not know me well I am trained as a computer scientist) some people dismissed work that did not include technical innovations, including some of my own work, as lacking substance. So in this computer science formulation, work that rigorously observes and clarifies categories and purposes of ICT use in the Global South is not appropriate or interesting for ICT4D conferences.

? Social scientists, meanwhile, expressed skepticism that fundamental technical innovations are even required for ICT4D work and often demonstrated a lack of interest in some core technical issues.

? And as the discussion around a co-located ACM SIG event during ICTD2010 continues, the potential to enhance unhealthy disciplinary walls has been closely examined. For example, could this ACM SIG event siphon off all of the techies to their own workshop, thus creating two entirely disconnected epistemic communities further exacerbating the problems we already see?

Thus, we have engineering versus social science straw-men, both of whom are laboring under dangerous misapprehensions. For computer scientists to think that work entirely focused on the social sciences is neither helpful nor needed for their ICT4D research is dangerously wrong. But, for social scientists to maintain that fundamental technical innovation is relatively unnecessary, or is techno-euphoric, or is based on the erroneous assumption that Internet, personal computer or mobile phone designs don't actually need any fundamental technical change, and perhaps change heterogeneous from the South to the North, change that truly could be empowering to the people; that too is wrong. For either group to think that they do not need to sit at the same conferences together, read each other's papers, understand the methods and underlying principles of each other's work, and even collaborate on co-authored papers is equally worrisome.

Add to this an Access to Knowledge straw-man. Of course these straw-men are being constructed in order to tear them down ? meaning I am sure nobody subscribes to these views in whole. But the A2K gloss goes something like this: Knowledge is some reified static thing, and our job is to be sure that all people have access to that knowledge. School, under this cartoon, is where young people go as empty vessels, passive and unthinking, and knowledge is poured into them.

As far as our earlier two straw-men are concerned, if a computer scientist does not value or if that person's department does not understand that human observation and analysis and development is fundamental to all of our work, that is truly bad. But if our social scientists do not value fundamental engineering innovation or if they are unwilling to understand at a non-superficial level these technologies, that too is bad. Substitute lawyer or poverty economist or policy specialist into any of these positions and the argument still generally obtains. And if any of these communities silos itself off from the other, then that is the death knell to our interdisciplinary project.

All of these challenges are answerable. The ACM SIG and its London event could be architected in a way to enhance and not extinguish cross-disciplinary work. Traditional departments can grow and expand in ways that recognize they cannot do it alone. And individuals can commit to studying and collaborating across the disciplines.

And finally we come, as a result of all this disciplinary lumbering, to the most significant and troubling knowledge gap. The biggest gap-producing problematic in the ICT4D program as both an academic and field focused project is that it has failed profoundly to be a **progressive** intellectual enterprise. This essentially means that it has failed to learn from the past; we have collectively failed to stand on the shoulders of those before us. Since the project, at least in the way we are formulating it here, is really only a decade old ? it

means that we have failed to stand upon **each other's** shoulders.

Heeks reminds us that most all ICT4D projects end in failure ? absolute failure, sustainability failure, or partial failure. That is fine in my estimation as far as it goes. The problem is not the failures. The problem is our failure to **learn** from the failures, or indeed failure to **learn** from our field's occasional successes as well.

To conclude, then, how can ICT4D become a progressive research endeavourer? I believe there are at least four things we must do:

- 1) Return to our inter-disciplinary and holistic roots and immerse ourselves in multiple literatures,
- 2) avoid the pitfalls of fetishistic techno-utopianism that, regardless of our rhetoric, is a far-to-common reality,
- 3) spend time on fundamental innovation and work and this means in particular **patient** money,
- 4) develop a set of fundamental shared problems, and shared methods and be sure many of them are in the areas of evaluation and assessment.

To point one, the multi- inter- and trans-disciplinary nature of our project: it is clear that we need to continue our dialogue started here at this 2nd Harvard Forum. And we need to do a better job of reading across the disciplines, myself included. At the Berkeley conference I already mentioned one of the most senior computer scientists there had this idea: we need to create an ICT4D journal (there are at least a half dozen) and we also need an ICT4D trade magazine (there are over a dozen) and we need to bring people together at more conferences (there are hundreds of those). Clearly people are not reading the literature. While this blinkered condition is in my estimation reprehensible I too am guilty of not keeping up with the literatures. But this also goes to a problem of the academic and research communities in general. We are all rewarded for writing but not for reading ? so our incentives are to create more and more knowledge and, even in the presence of access to it, never connect back.

To the third point on fundamental work and patient money I really must turn to the donors. With only a few exceptions the period of performance on every award I have ever received in my academic career has been 18 months or under. To IDRC's credit you have, indeed, funded long-term projects. Of course I know of the five year Public Access to the Internet program as an example. But USAID has never given me money that lasted longer than 12 months ? and then has tormented me as I plead for no-cost extensions.

And finally to the fourth and last point, we all probably recall the story that at the start of the 20th century the German mathematician, David Hilbert, proposed a set of foundational research questions designed to help focus the attention of mathematicians on the most important questions of their time. These Hilbert Problems helped define much of the last century of mathematical research (and led to a good number of surprises and scandals ? of course I think of Alonzo Church and Alan Turing and Kurt Gödel who shook the very foundations of the field). The ICT4D community needs to develop a similarly weighty list of grand challenges that will focus our collective attention and help us track forward progress as it is made.

A set of my own candidate Hilbert Problems are listed here ? not because I think they are complete nor consistent ? but just to start that conversation:

1. Post-conflict computing

A number of unique challenges are present in immediate post-conflict settings and these settings call into question many of the assumptions of ICT4D. For instance a common trope is that penetration rates for

computers, mobile phones or the internet are monotonically on the rise. But many conflict and post-conflict settings have seen precipitous wartime declines in ICT penetrations. Or an assumption is made that electric grids are at least available in capital cities. But this is not always the case in post-conflict capitals. There are unique problems in national healing and reconciliation, capacity building, and reintegration and rehabilitation which all have ICT components to them. A strong research program in post-conflict computing will explore the necessary technologies, policies, institutions, and theoretical framings that will best connect ICTs to peace and reconstruction.

2. HCI4D

Why do we deploy personal computers into places where the technology is shared and not kept by a single person? Do we need a community computer instead? What does the desktop metaphor mean in a context that does not value or use desks? Why do we rely on the QWERTY keyboard for languages that do not include the ?Q?, ?W?, or ?E?? Do we need novel design methodologies to help bridge cultures and distance? These are just a few of the fundamental problems in the design of usable computer systems for global development. Computer/human interaction designers have only just begun to think deeply about the special challenges and needs in global development.

3. Appliances

A lot of debate has centered on the prominent rise of mobile phone use in low-income countries and thus whether mobiles are the technological ?winners?. The ubiquity of mobile phone networks, now usually with data support, is clear. And the desirability of mobility itself is also clear. Similarly, low cost laptop initiatives have captured considerable attention with the suggestion that these particular systems will solve all of the core ICT4D problems. In reality neither mobiles nor laptops are the perfect appliance for all situations. We need to better understand what the best design and form factors are for end-user appliances regardless of the network or distribution model. When do we want to use mobile phone styled appliances, when will laptops be best, and when are desktop styled appliances best? Furthermore, do we need to design an entirely new appliance, something with a more appropriate display or input device or better suited to end-user sharing for instance?

4. Sustainability

Financial self-sustainability of ICT4D initiatives is understood as an important question requiring further examination. What also requires ongoing study is ways to ensure other forms of sustainability: environmental, technological, social and cultural, political and institutional. For instance technical sustainability will be enhanced by easy to use systems or systems that allow for remote maintenance. Similarly, environmental sustainability is enhanced by low-power consuming devices.

* Learn more about an ACM SIG at <http://www.acm.org/sigs>.

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