

## Theory

# Understanding Our Knowledge Gaps: Or, Do We Have an ICT4D Field? And Do We Want One?

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

Some of us attended the ICTD2009 Conference in Doha, Qatar, certainly one of the biggest and most robust peer-reviewed academic conferences in the ICT4D space. I sit on its advisory board, so I've been following with keen interest a proposal to co-locate with the December 2010 ICTD meeting at Royal Holloway in London, a parallel, more technical, computer science-focused conference now called ACM DEV 2010.

In August 2009, Tapan Parikh, a faculty member at the University of California Berkeley, co-organized a workshop in Berkeley on Computer Science and Global Development. That workshop was supported with National Science Foundation 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 thus: Is ICT4D work real computer science? How can we raise the profile of this work within traditional CS departments? How can we get more respect for our work? Do we need more formal structure and organization to accomplish any of these goals?

To the last question, the response was "yes," and a structure was mooted, namely an Association of Computing Machinery (ACM) special interest group (SIG) to cover the ICT4D intellectual space.<sup>1</sup> The ACM is the world's oldest computing professional society, and work is under way to secure its sanction for this SIG. Granted, I'm always hesitant about growing new organizations or outlets in this space, given the saturation that would seem to call for consolidation rather than proliferation. A recent overview of ICT4D publishing outlets by Richard Heeks (<http://ict4dblog.wordpress.com/>) cataloged 16 specialty journals in the space, which seems an extraordinarily large number given the size of the research community. That notwithstanding, an ACM SIG in ICT4D seems to me to be a perfectly fine idea. However, along with the idea for an ACM SIG has come a call for a technical-only (really, a computer science-only) conference in ICT4D; and thus has sprung ACM DEV 2010, to be co-located during ICTD2010 in London.

All three of these activities—ICTD2009 in Doha, the NSF-supported workshop in Berkeley, and ACM DEV 2010—serve to remind us how frac-

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*\*Managing Editor's note: This paper was selected by the Guest Editors based on their review of the Harvard Forum contributions. The paper was then sent out for double-blind peer review. Dr. Best recused himself from editorial duties throughout this process.*

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

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tured our intellectual community can be along the lines dividing the social sciences and engineering, policy makers and the legal community, practitioners and researchers. In my opinion, this split has become perilous. Discipline siloing restricts the creative thinking and diverse ideas that come from combinations across disciplines.

Here are some of the relevant things that I heard at recent meetings:

- 1) In Doha, some computer scientists felt that the conference overly favored 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 from the social scientists is that the computer scientists would say something like this:  

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 10 people whether they liked my thing. Nine people liked my thing. Hoorah for my thing.
- 2) At the Berkeley workshop, made up almost entirely of computer scientists (and I should add, for those who do not know me well, that I am trained as a computer scientist), some people dismissed work that did not include technical innovations, including some of my own, 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.
- 3) Meanwhile, back in Doha, some social scientists expressed skepticism that fundamental technical innovations are even required for ICT4D work, often demonstrating a lack of interest in some core technical issues—who cares about these technical matters when only the human/social components are of importance?
- 4) And in more recent ICTD2010 planning discussions, the potential for ACM DEV 2010 to enhance unhealthy disciplinary walls has

been closely examined. For example, there is the chance that this event could siphon off all the techies to their own workshops, thus creating two entirely disconnected epistemic communities and further exacerbating the problems we already see.

Thus, we could have engineers versus social science straw people, cartoon exaggerations from each side that represent disciplinary overdrive, 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. For social scientists to maintain that fundamental technical innovation is relatively unnecessary, or is techno-euphoric, is also wrong. And it is equally wrong for them to argue that the core technologies do not need fundamental technical change which often must be heterogeneous from the Global South to the North or, indeed, from community to community. (The mobile phone is just fine the way it is, thank you very much, our straw people might claim.) For members of either group to think that they do not need to sit at the same conferences together, read one another's papers, understand the methods and underlying principles of one another's work, and even collaborate on co-authored papers is equally worrisome.

Add to this an Access to Knowledge straw person. Of course, these straw people are being constructed in order to be torn down because I am sure nobody subscribes to these views in whole or at the extreme. 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 people are concerned, if a computer scientist does not value human observation and analysis and development, or if the scientist's department does not understand that they are fundamental to all of our work, that will lead too often to engineers solving problems that no human has or missing opportunities to refine their designs based on real-world realities. But if our social scientists do not value fundamental engineering innovation, or if they are unwilling to understand these technologies at a nonsuperficial level, that too is bad. Substitute "lawyer" or "pov-

erty economist” or “policy specialist” for any of these positions, and the argument still generally pertains. And if any one of these communities silos itself off from the other, they ring the death knell for our interdisciplinary project.<sup>2</sup>

All of these challenges are answerable. An ACM SIG and its London event could be architected in such a way as to enhance and not extinguish cross-disciplinary work. Acting cooperatively, traditional departments can grow and expand in ways that are not possible if they act alone. And individuals can commit to studying and collaborating across the disciplines.

And so we come, as a result of all this disciplinary lumbering, to the most significant and troubling knowledge gap. The biggest gap-producing problem 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 who have gone before us. Since the project, at least in the way we are formulating it here, is really only a decade old, that means we have failed to stand upon *one another's* shoulders. As an example, consider Kentaro Toyama's reviews (<http://ict4djester.org/blog/>) of the telecenter movement, in which he finds that most centers ultimately fail while seemingly repeating the mistakes of those before them.

Heeks reminds us that most 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, and indeed, our failure to learn from our field's occasional successes, as well.

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

- 1) Return to our interdisciplinary 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-too-common reality.

- 3) Spend time on fundamental innovation and work; this means, in particular, to find *patient* money supporting multi-year initiatives.
- 4) Develop a set of fundamental shared problems and appreciation for mixed (and when appropriate, shared) methods. And make sure much of this focuses on robust evaluation and assessment.

To point one, the multi-, inter-, and transdisciplinary nature of our project: It is clear that we need to continue our dialogue started here at this second Harvard Forum. And we, myself included, need to do a better job of reading across the disciplines. At the Berkeley conference, as I mentioned, the idea was mooted that we need to create an ICT4D journal (as noted, there are 16 already) and an ICT4D trade magazine (there are even more magazines than journals), and that we need to bring people together at more conferences (there must be hundreds of those). Clearly, people are not reading the literature. Although this blinkered condition is, in my estimation, reprehensible, I, too, am guilty of not keeping up with the literature. 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 when given access to it, never connect back.

To point number two, at yet another recent meeting, this time Computing at the Margins, held at my own institution of Georgia Tech, it was suggested only half in jest that we need yet one more meeting or journal that will only publish *failures*—the ICT4D Failure Forum. While I keep underlining how we utterly do not need any more journals or conferences, perhaps a Failure Forum is just the bitter pill to kill our ongoing techno-utopianism.

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 less. To IDRC's credit, it has, indeed, funded long-term projects. I know of the five-year Public Access to the Internet program, for example. But USAID has never given me money that lasted longer than 12 months,

2. One of the reviewers of this essay, later revealed to me as Randy Spence, said it very well: “The less that academics, researchers, activists and others—from all disciplines—are working toward solutions, the more they are just watching and commenting on what is happening. For reasons of getting better technologies, usage and services, policies, business models and the many kinds of benefits that result, disciplinarity is simply writing oneself out of the script.”

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and has tormented me as I pled for no-cost extensions.

And finally, to the fourth and last point: We all probably recall hearing that at the start of the 20th century, 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 the 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 mathematics). The ICT4D community needs to develop a similarly weighty list of grand challenges to focus our collective cross-disciplinary attention and help us track progress as it is made.

My own candidate Hilbert Problems are listed here, not because I think the list is complete or consistent, but because it can start that conversation:

- 1) Sustainability: The financial self-sustainability of ICT4D initiatives is understood as an important question requiring further examination. Ways to ensure other forms of sustainability—environmental, technological, social and cultural, political and institutional—also require study. Technical sustainability, for instance, will be enhanced by easy-to-use systems or systems that allow for remote maintenance; environmental sustainability is enhanced by low-power-consuming devices.
- 2) Post-conflict and disaster computing: 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. Another common assumption is that electric grids are available, at least 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, all of which have ICT components. 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.
- 3) HCI4D: We deploy personal computers to places where the technology is shared. 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.
- 4) Appliances: A lot of debate has centered on the prominent rise of mobile phone use in low-income countries, and thus, on whether mobiles are the technological winners. The ubiquity of mobile phone networks, now usually with data support, is clear. And the desirability of mobility is also clear. Similarly, low-cost laptop initiatives have captured considerable attention with the suggestion that they will solve 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-style appliances, when will laptops be best, and when are desktop-style appliances best? Do we need to design an entirely new appliance, for instance, something with a more appropriate display or input device or better suited to end-user sharing?

An interdisciplinary progressive project that is neither naïvely utopian nor unduly pessimistic, but instead, is pragmatist-realist, with fundamental and patient scientific progress toward a few shared grand challenges—now that is an ICT4D field worth fighting for. ■