

Forum

What Constitutes Good ICTD Research?

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The emerging field of research that examines the link between information and communication technology and socioeconomic development (ICTD) has been carried forward by researchers mapping methods from their home disciplines onto this new terrain. With this journal logging six years of history (Best & Bar, 2003) and with the third International Conference on Information and Communication Technologies and Development (Dias et al., 2009) behind us, we have arrived at a point where it is worth taking stock of the distinctive challenges we have encountered as a research community. This article intends to propose some common criteria for identifying high-quality and promising research in the field, a significant challenge in itself, given the diverse range of disciplines involved—from engineering to public policy, from the social sciences to development theory.

The seeds of this article were planted in an exchange on a mailing list between its two authors over what standards were truly applicable across disciplinary and methodological distinctions (Toyama & Burrell, 2008). Despite our initial disagreements, we believe that an understanding of interdisciplinary commonalities and differences will inform how ICTD researchers conduct research, how authors write research papers, how they are reviewed, and how conferences and journals select those for publication. Some of these activities require collaboration or evaluation of work across disciplines, and an explicit recognition of their paradigmatic differences could help build bridges between disciplines by allowing disagreements to remain as such.

Given the nature of the topic, some disclaimers are in order. First, we emphasize that the ideas put forth in this article will naturally reflect its authors' particular educational backgrounds, research experiences, and personal perspectives. Burrell's formal background is in computer science and sociology; Toyama's in physics and computer science. Thus, our comments apply primarily to what we believe can be said about the disciplines of engineering (including computer science and the various engineering disciplines), the qualitative social sciences (including some, but not all, of anthropology, sociology, etc.), the quantitative social sciences (including some, but not all, of economics, public health, etc.), and fields with mixed methodologies drawn from the above (including information science, communications research, etc.). Although we have made an attempt to think through what is important in other disciplines (e.g., social theory, public policy), we refrain from claiming to speak for them. With this in mind, we hope that readers will be persuaded by the arguments we present. As with any field of study, what work constitutes ICTD and how quality is judged remain open questions to be determined by the community as a whole.

It's a cause for celebration, on the one hand, that such a varied group of people should unite in the quest to understand how technology inter-

acts with global development, and how it contributes to the goal of alleviating poverty. Given this common goal, it would be hard to believe there aren't many points of agreement. On the other hand, there are differences that ought to be noted, some of which seem to be deep, irresolvable, and epistemological in nature. These tensions between disciplinary worldviews can have a balancing, even creative effect, making the field stronger, richer, and more varied. Even when one disagrees with a discipline's foundational premises, a mature intellect should still be able to dispassionately absorb and evaluate the value of work built in that context (while perhaps remaining doubtful, even critical, of the context), in the same way that a Baroque architect should still be able to appreciate the beauty and coherence of Angkor Wat. What is crucial is that we agree on ways to distinguish differences in approach and perspective from inadequately carried-out research practice. The present confusion in demarcating one from the other is a source of angst and animosity in many interdisciplinary communities.

Citing some examples from ICTD work that illustrate how confusion around research quality may arise is in order. Consider an econometric analysis of the impact of mobile phones on national GDP that suggests that greater mobile phone penetration contributes to growth in GDP (Waverman et al., 2005). The analysis is based entirely on three bodies of data: the World Bank's World Development Indicators, the International Telecommunication Union's World Telecommunication Indicators, and the World Bank's Governance Indicators. Two widely accepted econometric models are applied to the data to justify a *causal* relationship between mobile penetration and growth rates. Nothing in the article looks at the microeconomic forces that might cause the former to contribute to the latter, though it references past work to suggest some possibilities. Instead, the authors sought to quantify a hypothesized trend at a macro-scale, and to this end, they triangulated their result with two established methodologies. Readers who employ qualitative, particularly observational techniques in their own work may find the ambiguity around the specific mechanisms and process that lead from mobile phone acquisition to economic gains to be unsettling. Yet, it ought to be recognized as a difference in research approaches and forms of evidence, not as a measure of research quality.

On the other hand, consider a qualitative investigation into West African e-mail scams (Burrell, 2008). The subjects interviewed were not a random sampling of any well-defined population, and the eight who were interviewed in-depth were further self-selected due to ethical and logistical constraints. The e-mails analyzed were those that arrived in the author's inbox or that appeared on cautionary Web sites. Nothing in the article can be said to meet criteria of statistical significance; thus, readers steeped in a quantitative tradition could find fault if the subsequent analysis is read to be proportionally representative of "West African Internet scams" in general. However, the significance of the authors' analysis is not in identifying averaged trends in scamming—the who, where, how often, and how much questions—but to try to answer questions of what, why, and how to understand more fully the social context within which scamming e-mails and activities are constructed from the little-known perspective of the scammers themselves. In relation to the field of ICTD, the purpose of the article was to argue from the basis of a particular lived experience about the ways that troubling patterns of racial and regional representation may endure in cyberspace, and how the possibilities of empowering self-representation through Internet access can break down. Like the previous example, the particular techniques used also represent differences in research questions and approach, not problems of research quality.

Misunderstandings of method, as these examples show, sometimes follow from a reader or reviewer's preference for certain kinds of research questions. Readers may impose upon a study to answer questions that it does not claim to and then find the study comes up wanting. In both examples above, it would be a shame if the differences between author and reader prevented the latter from acknowledging what is, ultimately, new knowledge. ICTD is richer for both pieces of research.

To sharpen the clarity of the task we are undertaking here, it is useful to first identify some key distinctive aspects of ICTD research. Doing so can help to indicate some of the unique demands on researchers in this field. We propose the following as the identifying features of ICTD research:

1. Regardless of how we define the phrases "information and communication technology" and "development," ICTD research

WHAT CONSTITUTES GOOD ICTD RESEARCH?

broadly involves a consideration of human and societal relations with the technological world and specifically considers the potential for positive socioeconomic change through this engagement. This intersection of interests narrows down considerably what is relevant from the broader realm of theory in the social sciences, in development studies, policy, and relevant professional fields, and in engineering.

2. Our work as researchers often entails considering and interacting directly with people in a socioeconomic strata quite different from our own and in distant locales. For many researchers, being an outsider requires that we come to terms with the multi-faceted differences (political, economic, cultural, ecological) from previous experiences and what is formally taught in our fields of study.
3. ICTD research involves both studies of the interaction between people and technology as it exists or evolves, as well as active intervention work—introducing a new device, system, or policy to achieve some objective of development. This wide range of objectives demands certain sensitivities of method.
4. Due to its breadth as well as its range of research activity, ICTD is richly multidisciplinary, and therefore there are challenges of communication and a lack of a shared foundation of concepts and terms. Some of these characteristics of ICTD research are shared with a number of other disciplines. Yet, the combination points to a unique set of methodological concerns.

Points of Interdisciplinary Agreement

We begin with our common ground—matters upon which we unequivocally agree. A useful starting point are the criteria for judging research quality set forth by Gaskell and Bauer (2000) and their notion of *functional equivalence* between qualitative and quantitative approaches. By functional equivalence

they mean that all research, regardless of the methods employed, is guided by some basic, overarching concerns with research quality, but the specific criteria used to judge how well these concerns have been addressed differ depending on the methodology or epistemological commitments of the researcher. The two concerns proposed by Gaskell and Bauer that cross methodological boundaries are *confidence* and *relevance*.

Confidence is determined in a research report by how researchers demonstrate that a legitimate research process was carried out and that findings are not simply a product of the researcher's imagination. It is also a judgment of whether the data and analysis as presented justify the findings. We break down these concerns, as they relate to ICTD, into accuracy, transparency and soundness of method, and empiricism.

Relevance is about the question of whether the research engages with concerns, debates, or theory within a field and what broader significance it has. As defined by Gaskell and Bauer, relevance addresses questions of why the research would be of interest to others, both for researchers in the field and the public at large. With respect to ICTD research, we discuss novelty, disciplinary relevance, and generalizability. Empirical methodology also increases the likelihood of relevant work.

Accuracy

One aspect of confidence is accuracy, a term that means different things to those with positivist and realist versus interpretivist leanings, but that matters in some form to all. The first judgment to make about a research report, no matter the setting, no matter how many data points, no matter the method employed, is whether the phenomenon under study is adequately described or captured in its reporting with some degree of precision.

Accuracy is theoretically easy to conceive within a framework of philosophical realism. It is the extent to which a description of how research was conducted or what was learned from that research matches objective reality. This is referred to in philosophy as the "correspondence theory of truth" (Kvale, 1996).¹ Objective reality, however, is difficult

1. As Kvale (1996) notes, the correspondence criterion in philosophy is also joined by the coherence criterion, which relates to the internal logic of a knowledge claim, and the pragmatic criterion, which relates to the truth of a knowledge claim in its application in the world.

to observe and convey with accuracy, and so there are degrees of confidence. Most statistical techniques note this explicitly through parameters that indicate that a statement holds, for example, with 95% confidence or credibility. In this context, information with greater confidence is desirable. In addition, for those who assume an objective reality, there is the critical problem of bias—whatever interferes in a systematic manner with a researcher's clear view of that reality. There are many sources of such bias: Selection bias can creep in without careful sampling; the way that a survey or an interview poses questions may lead respondents; a researcher's desire for a particular outcome may introduce bias. A carefully designed study will strive to reduce such biases, or it will include explanations of how the biases may impact the findings in any written report so that readers can determine for themselves the validity of any conclusions drawn. Standard ways to minimize bias include the use of blind control groups, random sampling, attention to and consistency in wording of questions, mechanical tools for observation and measurement, analytical tools for post hoc removal of biases, and so forth.

Those coming from an interpretivist perspective judge accuracy in relation to the completeness and richness of understanding of the social phenomenon as demonstrated in the research report. In practice, this often means that internal variation and contradictions evident in beliefs and behaviors are retained in the presentation of research findings (rather than averaged) to make the account more precise. Often, closeness of the researcher to the phenomenon under study—with the strength of claims of what is directly observed trumping second-hand reports—is used to judge accuracy. Related to this, interpretivists do not adhere to the correspondence theory of truth; they account for the consequences of the researcher's subjective perception and the problem of "bias" in a different way. They do value the study of phenomena beyond their own subjective understanding of the world, but do not pursue this by seeking to get as transparent a view on reality as possible. Instead, they often study alternate systems of meaning and value and the "social justification of belief" (Kvale, 1996, p. 37) held by others out in the world. The knowledge they generate is considered to be intersubjective, meaning that it falls somewhere between the subjectivity of the researcher and that of the researched; the re-

searcher acts as a translator rather than a transcriber of social phenomena. Following from this, an interpretivist research perspective also involves a certain way of treating language. How a question is posed and received by the interviewee, and how it is translated are especially tricky when researcher and researched are speaking across a cultural distance. A conversational interview process, where questions can be clarified and answers elaborated and revised, is part of the interpretivist process of improving the accuracy of findings (Suchman & Jordan, 1990). Instead of emphasizing consistency in the way methods are applied, researchers consider the flexibility of their approach to be key to the way they home in on intended meanings and core themes.

What seems to be accepted by both ontological realists and interpretivists is that generations of knowledge beyond the pure subjectivity of the researcher are desirable, and that symbolic descriptions are necessarily simplified, selective models of complex reality. Perfect accuracy may not be achievable, but greater accuracy is always desired.

Transparency and Soundness of Method

Confidence in a research outcome can come directly only to those directly conducting the research. Everyone else must necessarily hear the results and the analysis secondhand. So, apart from the hunches and experiences that other researchers might bring to evaluating research, what helps most to instill confidence is transparency and soundness of method. Gaskell and Bauer's criteria of confidence, in fact, highlight this component.

Explicit information—whom we talked to, where we went, what we observed, what questions we asked, what new systems we introduced, how they were constructed, through what process they were introduced, and how we otherwise collected the data on which our analysis rests—helps to increase confidence in the research. Furthermore, the process of analysis is equally important to specify what theoretical framework is being used, what ideas were considered, which were discarded, and so forth. Readers should have the opportunity to relate data to the findings drawn by the researcher for themselves. Interviewers do this by using direct quotes, survey researchers by making their data available, and engineers by specifying the designs they have

WHAT CONSTITUTES GOOD ICTD RESEARCH?

produced. A reasonable rule of thumb is that it should be possible for a graduate student with training in the methodology to repeat the implementation of the research project and any analysis, given sufficient resources.

In our original exchange, Toyama used the terms *rigor* and *replicability* instead of sound and transparent methodology. Through discussion, we found that the former words are loaded with additional connotations in some communities. Rigor is sometimes taken to mean quantitative, and replicability immediately suggests lab experiments where die-cut identical results are to be had from identical methodologies—a particularly difficult end to achieve when dealing with dynamic environments, as well as the unique effects that a researcher necessarily has on her or his human subjects. Neither of these nuances, though, was intended by Toyama originally. Therefore, we looked for terms without the baggage, and felt that *transparency* and *soundness* of method fit our criteria. It's our hope that every ICTD discipline values these traits.

Empiricism

In almost any discipline, a certain segment of the membership dedicates their attention to very abstract theory and philosophical reflection. Some great ideas have emerged from this type of work. Relatedly, the field of development tends to bring out idealist imaginings and a certain degree of utopianism. However, what is judged as high-quality research in ICTD must be indicated by an empirical grounding, with claims that are well and clearly supported with good evidence—quantitative or qualitative, primary or secondary—as long as the reader can have confidence in the evidence itself. Extrapolations of what may be possible with new systems and services are useful to consider, but they should be buttressed by this empirical foundation. By empiricism, we mean the grounding of research and claims in some evidence that is “of the world” as opposed to arguments following purely from theoretical principles or imagined ideals alone. More

specifically for the field of ICTD research, we see particular value in a non-dogmatic approach to research design that does not insist on any particular theory or technique and that involves a willingness to flexibly and creatively adapt and combine whatever tools or approaches emerge as best suited for the problem, site, situation, or population of interest. In keeping with this dedication to evidence, it is also important for ICTD researchers to distinguish efforts at evaluation from those of project marketing (as might be necessary for fund-raising, for example). It is in the best service of the communities we work with to consider fairly (and with the possibility of negative results) whether their interests are well served by services and systems that are introduced.

ICTD research that is driven by empirical work serves goals of relevance that are of particular importance to this field. Most researchers who carry out their work in a distant and unfamiliar setting will find their most basic assumptions undermined by the reality of that setting. It's one thing to set up a long-distance WiFi link in San Francisco, and another thing entirely to do so in rural Tamil Nadu, India. Similarly, the preferences of mobile phone users in downtown New York will likely not have much in common with the mobile phone preferences of fishermen in Uganda. For these reasons, we can expect various forms of fieldwork and the unexpected experiences thrust upon researchers to continue to be an important part of ICTD research now and into the future. At the same time, what is conventionally understood as the proper location for ICTD-related fieldwork should be considered broadly. It's accepted that a poor village or under-supported institution, such as a hospital or school, is a valid site, but for some topics, UN conferences,² NGO projects, drinking spots, local churches, and even the corporate world might also be legitimate field sites, to the degree that they interact with ICTD.

Novelty

If there is a single characteristic that runs through all research activity, regardless of discipline, it is the

2. *The effort to redirect scholarly scrutiny from the powerless to the powerful is attached to the term studying up and originates with Nader (1972). For some examples of this approach broadly in the domain of development studies see Ferguson (1990) and Lansing (1991). Some recent work in ICTD also looks not just at how targeted groups successfully or unsuccessfully receive technology but also how the process of developing and distributing such tools is negotiated by various stakeholder groups (Ho et al., 2009; Parikh, 2009) and what philosophies underlie the efforts of these groups (Ananny & Winters, 2007).*

stress on novelty. It is crucial that some aspect of the research has not been done before. It might be a new thesis, fresh data, innovative methodology, a novel invention, a first-time evaluation, a first *good* evaluation, and so forth. Novelty is also evident in the research findings. Are the findings in some way surprising in relation to theory or to common sense? Do they reorient the way we may think about development or design or about specific populations living in developing regions? Of course, it's not necessary for a body of research to be new in every way, but something in the work should extend the state of knowledge in the world, not simply repeat what has been known before.

Disciplinary Relevance

In ICTD, disciplinary relevance can be broadly interpreted as the topics at the intersection of ICT and D.

Taken literally, ICTs can include everything from the printing press to Africa's talking drums, but in the context of ICTD, "ICT" has the connotation of modern electronic technology, and central roles are played by the PC, the mobile phone, and the Internet. (Toyama & Dias, 2008)

The latter emphasis is due to the association of ICTD with the commoditization and mainstreaming of these technologies, but the field seems more than happy to re-examine older technologies, such as the TV, radio, and landline phone, while also welcoming novel technology, such as Dictaphone-like devices (Chu et al., 2009) and modified WiFi technology (Surana et al., 2008). As a practical matter, it is important to demonstrate disciplinary relevance in research papers through explicit citations of previous work, with care taken to situate any new research within the ongoing dialogue by the research community. There is somewhat more disagreement about what constitutes development, and we will address this in a later section.

Generalizability

As discussed in the previous section, relevance concerns the significance of a research effort to society more broadly. Considering how research findings might apply outside the specific, directly examined objects of study is important to the ICTD community, because this informs when and where existing projects and programs might be successfully intro-

duced. Good research will tend to contribute to generalizable knowledge, but it is critical to interpret such generalizability broadly.

The widely understood notion of generalizability is derived from quantitative methods, which draw on formalized procedures of data calculation, using random sampling from a given population. Whatever patterns are found in the sample are statistically likely to be true of the population as a whole. However, it's not only statistically significant results that are generalizable, but also case studies of small populations that identify new phenomena, causal processes, counterexamples, or additional evidence for existing hypotheses.

Many ethnographers employ a form of inductive analysis called "grounded theory" (Glaser & Strauss, 1967; Strauss & Corbin, 1990) in which abstractions, models, frameworks, and ultimately, theory are systematically constructed from empirical data, often starting with a single case study. The output of that work is some kind of model, and the model abstracts essential elements and relationships from the case. Generalizing in this form is different from quantitative statistical evidence, but through both the layering of case studies and the strength of researcher arguments, it allows movement from the specific instances to an application of the model in other settings (Kennedy, 1979).

Although we have already mentioned the importance of accuracy in research, it has particular relevance in the context of generalizability, because with generalizability comes the specter of over-generalizing. Results from statistical random sampling, for example, are generalizable only to the larger population from which the sampling takes place (and even then, only for a truly representative sample). For example, there is no guarantee that a result that holds for the Indian population, no matter how large a sample on which it is based or how statistically significant, will apply to East Africa. Similarly, a single case study is rarely enough to make assertions about what is taking place in other regions, though it can contribute toward models or hypotheses that offer illuminating new ways of thinking about an issue and may be demonstrated to hold more broadly through research in other settings. In both cases, accuracy is the foil of over-generalization.

These tensions can be best illustrated through an example. Jensen's work on mobile phone usage in

WHAT CONSTITUTES GOOD ICTD RESEARCH?

the fishing industry in Kerala, India (Jensen, 2007) is already recognized as a classic in ICTD research. He examined the arrival of mobile phones to a series of beach fish markets. Because the mobile phones offered coverage out to sea, fishermen began to make calls to inquire about pricing; that helped them decide on the best market to take their fish to. He summarizes, “the addition of mobile phones reduced price dispersion and waste and increased fishermen’s profits and consumer welfare” (Jensen, 2007, p. 919), which is a conclusion that is well supported by his field-based data. Jensen is careful to circumscribe the extent to which the results can be generalized: The article title itself is qualified with the phrase, “in the South Indian fisheries sector,” and in his conclusion, Jensen cautions against overgeneralization, suggesting that the effect might be most applicable for perishable goods and environments with good transport infrastructure.

Despite the care Jensen took to avoid overgeneralizing, his article is nevertheless frequently cited as “proof” that mobile phones boost economies everywhere. Keeping in mind the Jensen study, one of the authors of this article engaged in a series of interviews with fishermen working on Lake Victoria in Uganda and found some other elements of the market, of government oversight, and of natural resource management that could prevent the mobile phone from being similarly useful there.³ In this series of interviews, three distinct groups—fishermen who were hired laborers, fishermen who owned some equipment, and fish traders—were asked whether they used their mobile phone to acquire and compare prices among markets. The vast majority said that they did not. Often, the reason was due to the credit relationships fishermen/equipment owners had established with fish traders. The traders loaned money and boat engines, or supplied ice to the fishermen, and, in return, required that they sell their catch to the one trader alone (a market condition recognized by both Jensen [2007] and Abraham [2007] as a possible constraint). Furthermore, due to over-fishing problems that had recently become acute, local councils referred to as “Beach Management Units” had been established to monitor fishing practices and to penalize fishermen in possession of immature fish or illegal equipment. This new level of government oversight required

that fishermen register their boats at a specific landing site, so moving among markets consequently involved paperwork and a higher degree of scrutiny at markets where one was a stranger.

This work was a step toward mapping out the locations and conditions in which mobile phones can have the kind of beneficial effect Jensen documents. It contributed to refining the model of the mobile phone’s role in market functioning as well as offering evidence of regional variability. Rather than showing a phenomenon that is in itself generalizable, this research instead *speaks* to generalizability. In the case of Uganda, mobile phones did not appear to improve market functioning as dramatically as Jensen documents in Kerala due to some concrete conditions that were specific to that locale. Through this type of research process, we are able to determine what projects and programs can be moved out or scaled up, and what may get in the way of this, as well as what project adjustments must be made in different regions.

Generalizability was one of the central points of contention in our previous exchange (Toyama & Burrell, 2008). Toyama pointed out that applicability and generalizability were essential, because studies that make no attempt to consider how findings might apply outside the specific, directly examined case were of limited use to the community of ICTD researchers. Burrell’s concern, on the other hand, was that, without further clarification, a blind stress on generalizability would favor studies that amass data points and cover large regions, but that fail to explore a topic in depth, revealing interrelationships and the details of process as a case study might. A broadly encompassing notion of generalizability as described above is valuable to the disciplines we are both familiar with, but at the same time, in striving for generalizability, accuracy cannot be compromised.



In closing this section, we note that each of the qualities described above are continuums, and some qualities may be at odds with others. A result can be more or less novel (or “more or less surprising”), methodology can be more or less well executed, and so on. The tradeoff between these qualities is frequently a matter of personal choice, and can even be a source of some tension during the re-

3. This study is the subject of an article in progress.

search activity itself. This is where some subjectivity in judging research quality enters. Which should be more highly regarded—work that is strikingly novel, but sloppily executed, or work that builds on a known result, but is flawless methodologically? It's rare for even the most seminal research projects to rate highly on all dimensions, but striving for excellence is always worthwhile.

Remaining Points of Contention

There are a number of enduring differences among disciplinary views on how the social world functions and how technology comes into play. This section explores a few that we think of as significant to the ICTD community, beginning with what seem to be the greatest barriers and proceeding to points that seem resolvable. We might call these *disciplinary value systems*. We can see how the strength in interdisciplinary fields is perhaps that members care about and pursue different convictions, and that other disciplines can provide a check on the runaway pursuit of these convictions to prevent both ungrounded hype and overweighted emphasis.

Philosophical Foundations

One of the ongoing challenges in many academic disciplines, and particularly in interdisciplinary ones, is the question of the philosophical basis on which scholarship advances. Within ICTD, there are frequent clashes between those who subscribe to various flavors of ontological realism, and those who lean toward more idealist epistemologies. Scientific realists, for example, postulate there is an objective reality that can be described with greater and greater accuracy through experimentation and increasingly sophisticated instruments of observation. Interpretivism, on the other hand, rests on an idealist foundation, where consciousness and conceptualization are primary, and where there is a special attitude taken toward language, which is viewed as the public expression of consciousness and an imperfect (but still the primary) way to get access to another's motives and meanings, as well as to the symbolism attached to one's actions in the world. While many of the deeper differences are fundamentally incompatible and unlikely to be resolved any time soon, they don't necessarily prevent dia-

logue around the practical matters of research. Speaking practically, most researchers understand that research is not conducted from a philosophically pure position; it requires adaptation and compromise and inevitably butts up against the logistical limits of time, funding, and access to secondary data, field sites, and informants.

Reflexivity and Bias

Researchers come with all of the complexity of being human and are shaped by their own socialization within family, school, religious institutions, professional fields, and broader society. The data one hopes to find, how one interacts with subjects and phrases questions, and how results are interpreted, are not controlled by purely and objectively formulated research interests. Researchers from different disciplines and epistemological perspectives diverge on whether they consider these permutations primarily as a pollutant (labeling it "bias") or also as a resource. For those who take the "pollutant" view, the focus is primarily on minimizing this bias or reporting it, for the sake of transparency, in the description of their methods. Ethnographers and others taking an interpretivist stance attempt to leverage their presence in a research setting, recognizing that much of what unfolds in the social world is taken for granted, nonverbalized, and unseen. From this perspective, researchers and their inadvertent social stumbling in a foreign society, their confusion and questions, can bring social practices to light that would otherwise not be directly discussed.⁴

Regardless of whether perturbations arising from the researchers' presence are seen as a ploy or a nuisance, reflexive analysis of the researcher's role in ICTD is important, particularly because ICTD research so often involves a cultural gap between the researcher and the researched. Reflexivity is not only a matter of considering the impact of the researcher's disruptive presence, but also of thoughtfully considering one's normative assumptions about health, education, technology access, equality, family roles, etc. Engaging seriously with alternative perspectives one encounters in the course of research and then reviewing one's own struggles to accept or understand is a worthy pursuit in general, even if not related specifically to the reporting of research

4. Garfinkel (1967) elevated the disruptive intervention of the researcher to a systematic and purposeful method in his development of ethnomethodology.

WHAT CONSTITUTES GOOD ICTD RESEARCH?

findings. It matters that the moral value placed on such contentious issues as domestic violence or HIV/AIDS prevention can be vastly different between researcher and subject.

Difference vs. Commonality

There are some temperamental differences between fields that don't necessarily result in outright contradictions, but which can nevertheless stir controversy. One of them is the focus on differences between regions and communities vs. the search for consistent, overarching commonalities.

For example, ethnographers who treat culture as their prime concern generally adhere to the idea that cultural difference constitutes a persistent and consequential reality in human societies, and that these differences are the most interesting aspect of their research. Cultural difference simply exists, and it matters because it informs the way people make decisions about what to buy, what technologies to use and how to use them, and what projects, programs, or institutions to participate in. There are well mapped out cultural differences in mobile-phone use and in terms of how receptive a society is to particular phone services. While "caller tunes" (specified music that callers will hear instead of ringing) are a runaway hit in India, mobile payments have thrived in Kenya (Morawczynski & Miscione, 2008). Broader cultural forms and institutions map to these differences. In India, the Bollywood movie industry is partly responsible for prompting demand for "caller tunes," whereas in Kenya, the combination of dispersed families, rural-to-urban migration patterns, and poor physical security generates enthusiasm for mobile payments.

Other scholarly communities, including many economists and social psychologists, devote the work within their disciplines toward an understanding of general human behavior that is common across cultures (Bardhan & Ray, 2006). They pursue the logic that says differences in behavior can be explained as the outcome of a complex interaction of genetics, environment, social forces, etc., and that these variables feed into a "formula" of human behavior that is essentially universal. Given the complexity of the formula, simplified models are often constructed that emphasize average or majority behavior. Thus, they find improvements in education with camera-based monitoring of teacher attendance (Duflo et al., 2008) and correlations of

growth in national GDP with mobile phone penetration (Waverman et al., 2005). Technologists frequently ally with a large-scale perspective, given their desire to see a single solution work for as many people as possible.

We believe these differences are a matter of disciplinary preference, but that each approach can complement and rein in the other. Solutions are sometimes prematurely scaled before determining how well they work and how dependent that is on context, thus wasting valuable resources (Kammen & Dove, 1997; Easterly, 2006). Too narrow a focus on difference may show what works, but without offering any big picture possibilities that go beyond a single village or community. For a complete picture of ICTD, it's essential that we know both that there are 4 billion mobile phones in the world, and that there are unique use cases and certain dimensions of variation across various geographies. It's important to invent technologies that everyone will find useful *and* to adapt them for local needs and aspirations.

Starting from Problems vs. Values

The emphasis on problems versus values (in the sense of what a person or a community values for itself) often relates not to a choice between one or the other, but to a matter of ordering, and most researchers will accept that both are important. The difference is often from whose perspective and from what evidence a project is initiated. This also circles back to the difference between interpretivist views that place attention on how people perceive the world and act (based on those perceptions) versus a realist view that assumes a coherent, underlying reality in the way research is framed and pursued.

The problem-solving-first approach emphasizes a pragmatic criterion of truth (see footnote 1)—that the proof of an idea is in its application in the world. An intervention that can be shown to produce measurable improvements represents a valuable advance in knowledge. However, in an effort to solve problems quickly on large scale, a concern for local values, preferences, and opinions may become secondary.

A values-first approach believes that solutions can't (or ethically shouldn't) be forced on people and that a shared perspective between researchers and the communities they research is essential. This approach may involve initiating research not from an

objectively identified problem, but through participatory development or rural appraisal techniques to determine priorities driven by the community (Chambers, 1995). Furthermore, an emphasis on understanding values can also be about concerns that go beyond basic needs, such as self-representation and empowerment, creative expression, and entertainment. All communities are, in some way or another, well functioning and wish to be seen outside the grid of their problems. On the other hand, efforts to understand, no matter how carefully they are undertaken, will not improve the health and well-being of their subjects in and of themselves.

Clearly, both temperaments are important for the field. The best examples of problem-solving ICTD work are sensitive to the peculiarities of local social relations and to a sense of the particular history of a place (Gandhi et al., 2007). A balance that respects both is likely to result in the most impactful development outcomes.

Different Notions of Development

Which aspects of life are and are not important as part of global development goals is not a settled debate in the development community, and ICTD inherits this uncertainty. The field of development was founded as the study of changes in gross domestic product (GDP) linked to alterations made in the industrial sector (Easterly, 2001; Helpman, 2004). Recognition of the growing gap between rich and poor—even under conditions of rising GDP—and the inadequacy of national-level averages yielded greater attention to the particular needs of the poorest segments of society (Basu, 2001). Broader formulations sought to ensure baseline quality of life for as many people as possible along multiple dimensions beyond the purely economic. In recent years, the Millennium Development Goals that simultaneously push for universal education, improvements in child and maternal health, and a host of other gains is an example of that increasing multi-dimensionality. Sen's (2000) alternate formulation suggests development ought to be about building capacities and increasing freedoms. There are additional tensions between top-down versus bottom-up approaches, between providing welfare and promoting agency, and between paternalism and partnership. For example, recent research argues that media consumed for entertainment drives interest in technology among the poor and marginalized,

and in important ways, shapes how they envision and pursue a better life (Appadurai, 1996). Entertainment, however, is not cited in lists like the Millennium Development Goals, though the intended beneficiaries of aid frequently seek it. One article outlines this tension nicely with a discussion of welfare versus agency, using the example of a development organization that pulled its support for a community-radio project when the local participants seemed interested only in listening to music on the air, and not discussions of hygiene or agriculture (Ratan & Bailur, 2007).

This reflects a tension in how the boundaries of the research practice field are policed and what merits the label of ICTD research. The issue is about how relevance to the field is recognized through familiar or less widely recognized notions of development. Given that different ways of understanding "development" is an ongoing debate in the global development community as a whole, it seems unlikely that we will be able to agree to a single objective for development within ICTD. By making clear in our writing what our individual development goals are, or what constitutes something akin to development according to the populations we study, we allow readers to evaluate the work in the context of the stated goals.

For ICTD, what we'd like to propose is an acceptance that all of these viewpoints will and should continue to coexist within the community. Instead of spending our energies trying to quash other paradigms, it seems more fruitful to seek to understand work conducted in the frameworks of others.

Conclusion

In this article, we have attempted to cover some of the points of agreement and ongoing disagreement about the qualities of "good research" in the various disciplines that conduct research in ICTD. We believe that by identifying differences (perhaps irresolvable) in how varying fields approach this research, that progress has been made toward respecting what different disciplines bring to the table. The eventual goal is to agree that research characterized by different traits could still be considered good research in ICTD.

In some related interdisciplinary communities, the response to a desire for higher research standards and evaluative criteria has been criticized as more and more stringent and narrow evaluative criteria

WHAT CONSTITUTES GOOD ICTD RESEARCH?

and the production of cookie-cutter studies (Dourish, 2006). Whether this community accepts and recognizes novel and innovative work that does not fit an emerging mold, or whether it falls toward rewarding work that is thorough and adequate, but not necessarily innovative, is an important test. It does seem to be the nature of scholarly work to reward the familiar, refinements to paradigms rather than big indigestible shifts in thinking. Despite the lengthy criteria asserted above, we do believe in making room for what is innovative, if not precisely adhering to all these criteria, particularly in this new and emerging field.

In his original working paper Toyama noted, "Exactly what counts as 'methodologically sound' depends on the field from which the methodology was taken; most research communities have good standards that are well-understood." In the introduction, the concept of functional equivalence was mentioned briefly. The idea is that while confidence and relevance of findings are key concerns for all research projects, the actual criteria used to judge them will vary among research methods. The distinction in Gaskell and Bauer's work was between quantitative and qualitative work (2000). This is not necessarily the primary divide within the field of ICTD. There are a number of common research procedures; the qualitative versus quantitative distinction is one among many.

A worthwhile next step would be for different disciplinary/methodological groupings that participate in the ICTD field to lay out some of these more specific standards as guidance for evaluation. What should one look for in a study using baseline and post-intervention surveys? What are the criteria for judging economic modeling in ICTD work? What standards do we expect an ethnography to be held to? How should user interface designs built for poor, illiterate communities be evaluated? Compiling and presenting some existing guidelines and examples could be a useful next step.

Similarly, it would be helpful to understand what discipline finds most interesting in the work of other disciplines. What intrigues ethnographers about design? What do engineers find interesting about qualitative research? What do sociologists find illuminating in economics? Through sharing better knowledge about what is of greatest value to others in the ICTD community, perhaps we can increasingly celebrate one another's unique strengths. ■

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