

Out There

Alex Taylor

Microsoft Research

7 J J Thomson Avenue, Cambridge, CB3 0FB, UK

ast@microsoft.com

ABSTRACT

“Out there” is increasingly becoming a topic of concern in HCI. Thanks to various clarion calls, researchers in the field are turning their attention to technology-mediated activities that are shaped less by Euro-American sensibilities and defined more by how they are culturally and geographically distinct. Fieldwork and ethnography researchers, for instance, are beginning to investigate ICT use at religious and spiritual sites, by the socially excluded and disenfranchised, and by people in developing regions. In this paper, I concentrate on the latter focus on development to reflect on HCI’s disciplinary turn “out there”. Specifically, I take the following three themes as common rhetorical devices in such work: (i) the network, (ii) difference and (iii) complexity. Through examples, I discuss how each of these themes has been mobilised. I then use materials from anthropology, science and technology studies, and to a lesser extent geography and postcolonial studies to complicate and in some cases question the interpretative frames that are being applied. Thus, my hope is that this paper is seen as a thought piece that deepens our thinking around HCI’s efforts to look “out there” by paying critical attention to what is going on “in here”.

Author Keywords: Anthropology, development, ethnography, fieldwork, ICT4D, networks, postcolonialism.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; K4.2 Computers and Society: Social Issues.

General Terms: Design, Human Factors.

INTRODUCTION

A consequence of HCI’s third-wave [9], or third paradigm [23], has been the move to expand the field’s empirical foci by looking, as it were, “out there”. Alongside the efforts to take experience seriously and move on from limited notions of the user and performance/productivity, there have been a growing number of attempts to point the lens of HCI towards some very different kinds of practices and people. Not only are we turning our attention away from single users interacting with PCs and toward rich and nuanced forms of computer-mediated collaboration, we are also beginning to investigate unfamiliar

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI 2011, May 7–12, 2011, Vancouver, BC, Canada.

Copyright 2011 ACM 978-1-4503-0267-8/11/05...\$10.00.

communities, far flung places, and practices not ordinarily considered when thinking about information communication technology (ICT).

The general thrust of this movement has been motivated by the argument that HCI has neglected significant segments of society and sometimes overlooked sizeable yet marginalised members of the world’s population. HCI, it is suggested, has been preoccupied with its own kind: largely white, middle-class men—and computer scientists, engineers and academics at that [6]. Thus we have paid little attention to the relationship women have with technology [7, 46] (and the role of feminism in HCI [4]); the role technology has and could have amongst society’s disenfranchised [13, 14, 40, 47]; and that sizeable portion of the world’s population making up what has been euphemistically called the Global South [8, 35, 38, 39, 41, 51, 56]. Moreover, the attention we’ve given to spirituality, religion [5, 53, 54, 55] and, surprisingly perhaps, even television viewing and sport has been decidedly wanting [6].

Without a doubt, the calls to address HCI’s narrow foci are laudable. It is obvious that technology and, specifically, information technology has the potential to play and in many cases already plays a crucial role for many besides the Web surfing, Facebook using Twitteratti. What I want to contemplate in this paper, however, are the motivations that underlie HCI’s turn “out there” and what as a field it hopes to accomplish by pursuing such a move. I want to state emphatically, that my aim here is not to criticise the efforts to expand HCI, nor is it to judge, negatively, the attempts to redress some of its longstanding prejudices. I am hugely sympathetic to both projects. My intention is to better understand what seems to be a purposeful trend amongst my contemporaries and to ask how we might usefully frame and, in turn, direct it in constructive ways.

Before moving on, I want to also say that this is not intended as a design orientated paper in any conventional sense. I won’t close with any design implications. Nor do I intend to produce what Dourish has suggested is ethnography’s alternative: “models for thinking about... [social] settings and the work that goes on there” [17, p. 549]. What follows is targeted at deepening our thinking as HCI researchers and how it is we go about plying our trade. My hope, specifically, is to take seriously the attempts by many of us involved in fieldwork and ethnography in HCI to look beyond the field’s established borders. If it is not too bold an aim, I want to begin the no doubt arduous journey of thinking deeply about what, exactly, we are doing in casting an eye “out there”.

THE INSIDE OUT

In her book “The Network Inside Out” [36], Annelise Riles discusses a problem confronting the anthropology of still nebulous topics such as globalisation, transnationalism and networks. Riles, a legal anthropologist, examines the knowledge practices within and around international law and uses her empirical materials to demonstrate how anthropology might resist its long-established methods of separating and consequently (re-)constructing networks of relations ‘characterised by systematic complexity’. She especially targets the anthropology of globalisation and what she sees as its counterpart, transnationalism. I cite her comments on transnationalism at length to offer a flavour of her position:

“Consider for example, the methodological problems that anthropologists now understand as endemic to the ethnography of globalization. Despite the excitement surrounding this literature, in practice, studies of transnationalism have tended to yield familiar analytical paradigms writ large— notions such as “community” or “tradition” long outmoded in other anthropological domains. In my view, this traditionalism springs from a methodological source. What renders the field of transnationalism “new” is not so much the discovery of a new field site or the set of material conditions but rather the ethnographic encounter with knowledge practices already familiar to, and indeed in use by, the anthropologist at precisely the moment at which he or she seeks insight through fresh ethnographic observation. We might understand the impulse to exoticize through notions of community, identity, or tradition that characterizes this literature, then, as a methodological device, an effort to render the familiar strange so that it might be apprehended as ethnography.” [36, p. 5]

Rather harshly, perhaps, Riles criticises the new anthropologies of transnationalism (using her points as illustrative of trends in research on globalisation) for exoticising communities, identities and traditions for its own ends. She contends the mechanism of exoticising—of ‘making strange’—is pursued so that the work is seen as ethnographic. The analytical insights themselves, she intimates, bring nothing new to the underlying ideas and thinking in anthropology. Indeed, Riles argues that the predisposition to see the global, transnational or network “out there”, or as she calls it “outside”, obscures what might be going on, if you will, on the inside: “Anthropological analysis is reduced to restatement, to repetition, to generating reflexive modernity’s ‘doubles.’ All one can do it seems, is to identify instances of globalisation...” [36, p. 5].

Through the anthropological studies of multi-national legal organisations, Riles is then making two important points: first she argues that in the rush to look “outside”, anthropology has found itself restating the tropes of difference: that people are different, places are culturally distinct, and that any interconnections get very complicated because of these different ways of being. In effect, the anthropologists are extending their purview to look at the global and transnational, and lo and behold they discover the world is, well, multi-faceted and complex. This outcome Riles fairly points out is hardly surprising and merely succeeds “in the identification of new multisited ‘plac-

es,’ diasporic ‘groups,’ or technological phenomena for anthropological study” [36, p. 6].

Riles second point, arguably a more fundamental one, is that social science persists in seeing the network everywhere and describing just about any kind of collective or organisational practice in terms of the network. This she argues refigures what social science is accountable for. The analytical objectives are focused on animating, *ad nauseam*, the characteristics of the network, e.g., connectedness, mutuality, complexity, mutability, etc. etc., to such an extent that the social sciences have become accountable to nothing else.

These two points in Riles position are what I want to pick up on and use in setting out this paper. It is at the juncture of HCI turning its attention “out there” that I wonder whether we risk falling foul of the two-part trap that Riles describes. It’s not that I think that HCI simulates this situation, exactly (or that Riles accurately represents social science); undoubtedly, there are some notable differences. Riles discussion, for instance, is limited to some of the peculiar and protracted methodological discussions in anthropology. Moreover, as a field, anthropology is for the most part concerned with new ways of making sense of and understanding cultural specificity, not the application of its results in engineering and design disciplines. Nevertheless, I can’t help but wonder whether a number of us in HCI are caught up in an exercise of repeatedly looking further afield so that we can report back that things are different out there, that people’s ways of knowing and practices are culturally situated, and, furthermore, that their activities are interconnected in complex ways. These are, of course, important points, but as a field that strives to produce new and hopefully provocative perspectives on human-computer interactions it seems we should be aiming to introduce something else besides these familiar ways of seeing.

Thus, what I’d like to do in the following is modestly follow Riles’ example by turning, as she puts it, the network inside out. That is, I want to try to turn our interpretative frame inside out so that we might somehow catch sight of ourselves, looking out there. In attempting this contortion, three issues, in particular, will interest me:

1. how it is we are configuring the world out there;
2. the analytical resources we assemble to do so; and
3. our own roles in the processes of configuring “out there”.

For the purposes of illustration, I approach these issues by focusing on recent research in HCI that has targeted development in emerging regions and has been referred to as ICT4D or, more recently, simply ICTD. As I see it, this research epitomises HCI’s attempts to look beyond its traditional boundaries, tackling topics as wide-ranging as globalisation, transnationalism, colonialism, poverty, and the digital divide, as well as those topics more familiar to HCI. Inevitably, this focus on development and ICT narrows the applicability of some of the points I will make. Even so, my aim, as the paper’s argument progresses, is also to draw out some points of general value.

IN HERE

Broadly, I hang the first part to this paper on what I see as three reoccurring themes in HCI's efforts to look out there: (i) *the network*; (ii) *difference*; and (iii) *complexity*. I use these ostensible themes not as a rigid taxonomic scheme but rather as a means to elucidate my points—to complicate and hopefully develop where it is I want to go with my argument and where it may be constructive for us to go as a research field.

My thinking in these terms has been informed by an eclectic collection of readings that grapple with pointing the empirical gaze out-there [2], and that query the ubiquity of the network as a conceptual apparatus [1, 15, 49]. The discussion specific to networks is informed by some relatively recent ideas in science and technology studies that engage, sometimes critically, with actor-network theory. In particular, I find inspiration in John Law's "After Method" [29] and look to a number of works that shift the framing of social (inter-)action to accommodate not just the agency of humans, but also that of things or non-humans [e.g., 3, 28, 45]. My critical discussion of networks also draws on anthropology, using the work from Riles, introduced above, and Marilyn Strathern's early but still apposite arguments about partiality and networks [43]. Borrowing from these readings, my hope is to show that HCI has tended to use the network as a taken for granted way of thinking about "out there" and, as a consequence, has potentially restricted its ideas of technology and its design.

The second thematic discussion, focused on the theme of difference, is informed by a longstanding debate in sociology and anthropology, one in which a critique is levelled at work that exoticises or "makes strange" foreign, "primitive" people [33, 52]. A principal point I wish to make here is that in mobilising the network as an analytical device, HCI risks rehearsing some of the weaknesses identified in the sociological and anthropological studies of far-off places and people. Specifically, by framing "out there" using the language and ideas of technologically mediated connections and relations (i.e., of networks), HCI runs the risk of promoting some troubling notions of difference. This difference-making sets ways of knowing originating through largely Euro-American sensibilities against those of other foreign, "less-developed" peoples. To consider an alternative view of difference, I find inspiration in the book "Science and African Logics" by historian and philosopher of science Helen Verran [50]. The proposal put forward is to see difference-making as on-going, contingent on the local and unfolding relations between people and things.

In the last of the three themes, I extend this argument to consider what Riles contends is another trope born of the network perspective, that is complexity (also see [48]). I argue that complexity is treated as a forgone conclusion in HCI research that views "out there" in terms of the network. Yet, crucially, this complexity is something seen and interpreted from "here" looking "out there", and thus something to be solved or ameliorated from the outside looking in. Referring again to Verran, I put forward the possibility of seeing complexity as something in the making, produced and re-produced "right there".

This, I contend, shifts how and where we think of human-computer interactions and their design.

Next, then, I will discuss each of these three themes in greater detail. Following this, I will draw out what I think the broad implications to be for HCI.

The Network

As I see it, much of the published literature in HCI that seeks to look "out there" hinges on the notion of the network, sometimes implicitly and in some cases explicitly.¹ The use of the network in this context appears to be predicated on two basic ideas. One, we find an understanding and application of networks in relatively conventional terms; our attention is drawn to the groupings of people, communities and/or cultures that are related in some fashion. Both the nodes of the network and their many interconnections are viewed as empirical concerns that might be informative in systems design. Transnationalism and globalisation take this idea of the network as their starting point [36]. Technologically-mediated, social networks are an obvious derivative.

The second understanding of the network is an extension of the first. In this case, a principle concern is for people or things that move between the groupings—between nodes of the network—and how under some circumstances these people/things can transform, i.e., undergo some material change and/or change in how they are understood. This interest in movement or transformation adds both temporal and spatial dimensions to the network as an analytical device. These ideas are central to actor-network theory [29, 30], a programmatic view of the relations between humans and things that shaped contemporary science and technology studies and has had a significant impact on numerous fields in the social sciences.

A recent paper introducing contemporary thinking in post colonial studies to the HCI community makes explicit use of both these understandings of the network. Under the moniker "Postcolonial Computing" [25], the authors, Irani, Vertesi, Dourish, Philip and Grinter, articulate a clear and convincing argument for using postcolonial theories to advance a position on ICT in development contexts. In discussing how immigrant populations in the US enact their various cultural identities in dynamic ways, they write:

"... the diaspora case illuminates the fluidity of cultural, regional, and transnational boundaries, as well as the variability of the what "home culture" can mean in daily life. People relate variably to a range of local and international networks, producing their cultural identities through a variety of signifying practices..." [25, pp. 1313-1314]

Irani et al. clearly describe the network as something that is made up of numerous elements (of various scales) and that is

¹ I'm aware that the word network and its associated nomenclature are not always used explicitly, but I believe it is reasonably uncontroversial to suggest that notions of separate-but-connected and, by implication, ideas of distributed networks of people and technology are commonplace in both the empirical and design oriented works focused on culturally and geographically distinct places and practices (see, for example, [7, 19, 38, 55]).

dynamic, fluid and multi-faceted, thus invoking the first of the two understandings of the network I've described. Later, they also make specific reference to the possibilities of transformation that I identified in the second. Through an example of a Brazilian company's efforts to build computers compatible with the Macintosh operating system, they describe how legal, economic, corporate and local interests can come together, shaping not only the use and appropriation of computing, but also how technology figures in ideas of innovation. As the authors explain more generally:

"... the insights of postcolonial studies and STS [Science and Technology Studies] speak at once to the highly local and contingent practices that we see at work in different specific sites of technology design and use, while at the same time recognizing the ways that those localisms are conditioned and embedded within global and historical flows of material, people, capital, knowledge, and technology." [25, pp. 1316-1317]

Here, then, we see the reference to movement and transformation through the network. In a clever inversion, the paper's authors develop their argument by situating HCI's practices in these very same flows and transformations. Using the terms *articulation* and *translation*—and in doing so echoing two key concepts in actor-network theory—they situate design practice *vis-à-vis* the production of culturally specific representational forms (articulation) and the movement of things and meanings between cultures (translation). Design, amongst other things, thus threads its way through the network, existing as something that is at once locally contingent and global, mobile yet immutable [27].

In referring to this example, I want to address the seeming neatness of the network as a framing device. Although I think this paper does a particularly nice job of shifting ideas in, around and between their materials and their own empirical/design practices, I want to suggest the network persists here (and elsewhere in HCI) as a taken for granted analytical device. It provides a seductive theoretical perspective that neatly joins things up when looking from "here" "out there" and, coincidentally, offers a convenient parallel to the technological metaphor of networks. Thus, in looking out there, I would contend we are seldom inclined to see or challenge the ontological status of the network. Again, Riles' words are pointed, but germane:

"It appeals to our collective fantasy about linking up with our subjects and finding in the "data" exactly what we set out to find. The idea of the Network, as the term is used here... as a form that supersedes analysis and reality, might also be imagined to borrow from the reflexive turn in the social sciences—from the notion that there is no longer such a thing as dependent and independent variables, that causes and effects are all mutually constituted in an endless feedback loop." [36, p. 174]

As I've suggested, Riles' answer to this quandary is to turn things inside out, to look back in on ourselves and our own systems and methods of practice and accounting. Such exercises in looking inward are inexhaustible, boundless. There are though, some tentative steps we might take to complicate and

get us thinking more critically about the network "out there", from "in here".

The anthropologist Marilyn Strathern offers us a starting point or more aptly, perhaps, an ending place in her article "Cutting the Network":

"However, the power of such analytical networks is also their problem: theoretically, they are without limit. If diverse elements make up a description, they seem as extensible or involuted as the analysis is extensible or involuted. Analysis appears able to take into account, and thus create, any number of forms. And one can always discover networks within networks; this is the fractal logic that renders any length a multiple of other lengths, or a link in a chain of further links. Yet analysis, like interpretation, must have a point, it must be enacted as a stopping place." [42, p. 523].

Some point? A stopping place? Might this be a point of departure? Can we ask where is it the networks are "cut", where they stop, where the stabilising flows of articulation and translation come to a halt? And, most importantly for Strathern, in what ways the networks cut everywhere else, besides, "back here"? In this way, Strathern turns our attention to the analyst's view, reminding us that it is but one of many possible renderings of lengths, links and chains—of networks. Such a position, I would contend, are the means by which we disrupt the loops, the fractal logics.

Riles usefully provides an example of going about such a venture in her field studies of the private world of self-regulated, global swap markets [37]. She illustrates how these markets and specifically the related practices of unregulated, private law operate in what she calls the *anti-network*. Even though it is global and at some level falls under the aegis of state-sanctioned law, Riles demonstrates that aspects of private law are locally produced and maintained through routine form-filling and mundane document workflows (something those from CSCW will be intimately familiar [e.g., 11, 20, 24]). These locally managed legal technicalities "make it possible for global actors to deal with one another without trust, without shared norms, without a thick web of personal relations..." [37, pp. 623-624]. Furthermore, the networks come apart because the sheer sophistication and complexity of the financial and legal instruments mean that expertise is organisationally and physically divided. Lawyers, for example, know they don't understand the relationships between all the agents and, indeed, are mandated by regulators to be physically separated from their trading counterparts. The neat systems of articulation and translation, Riles contests, thus sit uneasily with the locally achieved, mundane routines that are observed in practice.

To return to the paper from Irani and her colleagues, it would thus be fair to ask not only of the strands of transnationalism and the flows along them, but also about where it is they stop and how this stopping is enacted? Similarly, we might ask not how technologies move and undergo translations, but how it is they and their concomitant design practices stay just where they are? Mindful of simplistic binaries, we might turn to the words from the geographer Harrison and his invitation to con-

sider relationalities counter-point, the *non-relational* [22], as well as those breaks, gaps, and moments of pause: the *caesuras* [21]. As he laments “[a]nd yet I wonder in all of this where the concern is—and care—for distance, withdrawal, and disappearance” [22, p. 593].

Difference

These points, I realise, are not especially perspicacious. Even though I’d argue there’s been little evidence of it, it doesn’t take a big leap of imagination to ask what else there might be besides the network. In turning, next, to consider difference, I thus want to delve a little deeper, moving I hope closer to Riles’ inward-outward looking move.

As it happens, in proposing their “Postcolonial Computing”, Irani et al. [25] set out a nuanced position on difference. Making reference to postcolonial theory, they complicate the lines between us, “in here”, and those “out there”. Much of the literature in HCI, however, adopts a more problematic perspective. I want to use work from the anthropologist Genevieve Bell—who will be familiar to many in HCI—as illustrative of what I see as troubling.

In a paper published in the UbiComp 2006 conference proceedings [5], Bell uses a series of empirical observations to highlight the ways that modern ICTs are routinely combined with culturally-bound, spiritual practices. In one example, she describes the Chinese government’s encouragement of online ancestor worship through virtual memorial halls and cemeteries. Users of these services are able to choose from a selection of virtual tombstones, and to “burn e-incense, and leave e-flowers” [5, p. 152]. Explicitly invoking the network, Bell also describes how these portals are also facilitating worship from afar and connecting the dispersed Chinese diaspora through the online memorialising of the deceased.

Now I understand that Bell’s mission is somewhat unique, driven as she is to convince here multinational organisation to see beyond its national borders, and to disrupt, as she recounts it, their once troubling nomenclature for anywhere “out there”, i.e., RoW (Rest of World) [6]. Indeed, I feel she deserves a considerable amount of credit for transforming her organisation’s international outlook and, indeed, their *modus operandi*. Yet, what unnerves me about work such as this is that it repeatedly relies on the same strategy to report “out there”. One sees the juxtaposition of digital technology, such as mobile phones and the world wide web, against a set of culturally specific practices or rituals. I take this to be a means of accentuating locally contingent practices and the often surprising appropriation of technologies originally intended for neoliberal, Euro-American sensibilities. However, an unfortunate side effect is that it promotes an exoticising or making-strange of the “other”. It sets “out there” in relational terms to “in here”.

To explain why I see this as a problem, I want to reflect on fieldwork I did about three years ago in the Dharavi Slum in the outskirts of Mumbai. In total, I spent a month dividing my time between two homes, both made up of three generations of extended family members. One of the many things that struck

me in Dharavi was the relationship instituted with water. In most of the slums of Mumbai, water is rationed for between 4 to 6 hours a day, meaning that the majority of dwellers need to go to shared taps at prescribed times of day to use and collect water for washing, cleaning, cooking and drinking. For example, in one of the households I spent time with, the water was available at their “local tap” between 4-8A.M. The household’s “daughter-in-law” recounted to me that it was her job to get up and do the necessary chores that relied on the flow of water within these hours, as well as collect water in containers for other water-dependent activities during the day. She also told me she never went to the water source before 6A.M. because it took two hours of the water flowing before she considered it clean enough.

Another aspect of water flow I found hard to ignore was the unremitting presence of sewage. In the areas of Dharavi I spent time in, most of the narrow roughly carved out streets, surfaced with loose soil and gravel, were lined with 1 to 2 metre-wide open or barely covered sewers. Houses had their own off-shoots or arteries to this larger sewage system so that they could discard their waste from within the bounds of their property.

On seeing (and indeed writing about) the labour intensive, arduous and in some cases demoralising water-related activities in the households in Dharavi, and the ever-present smell of effluent, my impulse is to ponder on how different things are over there. How is it that people can live in such squalor? How do they tolerate the heat, the dampness, the dirt, the smell? And how do some appear so bright and happy despite it all? Intellectually, I also find myself resorting to the longstanding comparative tradition in anthropology, using my materials to reflect on our own Euro-American routines and rituals. As a matter of fact, on returning to my ordered and sanitised home and workplace in the UK, my initial questions centred on what if any parallels I could draw with life back here. What were the scarcity of resources that my home-life revolved around? What flows were ever-present and socially organising in my life? The flow of time, perhaps?

Taking such a standpoint of looking from here out there, it is virtually impossible not to see difference and to draw out comparisons. The trouble is, such a perspective really tells us very little about what is going on “out there”, or in the way I would prefer to phrase it “right there”. As Verran writes:

“Either way, a distinct “us” and “them” are locked forever together, and apart, through the specter of originality/mimicry. This is just what we would expect of a difference “outside worlds”—not real or doable. The only way to tell such a difference is to pull “their” world into “ours.” [50, p. 31]

Thus, it seems to me that a genuine interest in the cultural specificities of places like Dharavi cannot come from an articulation of how different “there” is from “here”. To do so simply achieves pulling worlds such as Dharavi into “ours”. I would contend, if difference is to matter at all, our concern should be for how it is enacted there, right there. How in Strathern’s [42] terms is the network cut “right there”?

We catch a glimpse of this alternate view of cutting the network through a memorable question that I was asked in Dharavi. One household member I interviewed wanted to know what other jobs I had. Involved in numerous entrepreneurial activities himself, my informant assumed I, similarly, had more than one job. Also, the way he made sense of me hanging around and asking inane questions was to view me as an NGO employee (having witnessed other NGO staff behaving in a similar fashion). This, he extolled, was obviously a woman's job, so it would make sense I must be making a more honest living through other means. This line of inquiry by a father-figure in a house in Dharavi deserves some considerably unpacking that I, unfortunately, do not have the luxury of doing here. What I want to suggest, however, is that it is just this form of making different (or making same) that offers a way out of us casting "out there" in relational terms to "in here". It re-specifies difference so that it is treated as a local member's category rather than belonging to someone peering "out there" from "back here". At the same time, it also allows us to see another rendering of the network, but again it is not mine, the analysts, that reveals itself but one that is constituted through the lines of sameness and difference cast from "right there".

Complexity

I hope, then, that some progress is being made in turning the inside out, laying bare our own analytical apparatus in enacting "out there". By considering complexity, as the last of my three themes, my aim is to take things one stage further, this time situating ourselves within the interpretative frame(s).

An indication of HCI and, more generally, computing's interest in developing regions is evidenced by the proliferation of related position pieces in computing journals [10, 18, 32], workshops [34], and conference panels [12, 26] all seeking to address the challenges faced. By and large, the depictions painted in these talks and published materials is of a world out there that is complex. The manifold relations between different people, technologies, agents and infrastructures are projected as the constituents of complexity and consequently viewed, in their networked assembly, as challenging.

But this, I want to argue, is only one side of the story of complexity and a side that arguably rehearses, as Riles suggests, modernity's doubles or to use Verran's phrase "the modern figuring of the world" [50, p. 35]. Again, we see the assembling of networks, relationality, difference and so on figuring the world out there as something other, something complex and yet, at the same time, something we can bring (our) order to. My hope in what follows is to show that another side of the complexity story is exposed when we turn the network inside out; we find that our own webs of ordering and knowing begin to unravel, revealing complexity underway—in the making—and thus things unordered and insoluble.

To pursue this thought, I will use an example from Verran's book *Science and African Logic* [50]. In her text, Verran builds and exemplifies her ideas using three case studies with the Yoruba-speaking people living in Southwestern Nigeria.

The second of these revolves around a set of experiments she conducted in the late 1980s that contrasted the ways Yoruba-speaking children and English-speaking Australian children apply generalised rules to recognise the persistence of matter. To construct the experimental conditions, various substances (e.g., water, Coke and peanuts) and "measurement" containers (e.g., cups, bottles, bowls, and bean balances) were used, and the children were asked whether the quantity of substances changed as they were moved between the containers. The experiments are reminiscent of Piaget's famous studies of children's mental development.

Verran's aim was to contest a universalist perspective (that Yoruba speakers learn how to generalise when they are older with impoverished skills) with a relativist account (that English and Yoruba-speakers fundamentally differ in the ways they make generalisations). She accomplished this by demonstrating that between the ages of 6 to 11, English-speaking children develop a notion of persistence of matter using the abstract concepts "thingness" and volume. In contrast, Yoruba-speaking children begin applying a concept Verran calls "unicity" from the age of 5/6 and use it confidently by 12. Unicity refers to the treatment of substances as units, e.g., one unit, half a unit, two units, etc. of peanuts. In short, the experiments showed that both sets of children were able to apply general rules about the persistence of matter, but did so using quite different features of the physical world.

This, then, typifies the kind of problematic difference-making I discussed earlier. Even the relativist position situates the Yoruba within the structures of modern scientific ways of knowing so that "out there" is still cast from "in here"—albeit in this case seen via an interpretative frame that is, analytically, one-step removed, and predicated on separateness but equity (something Verran herself calls the "trivialising of difference" [50, p. 154]).

Fortunately, Verran offers a thorough critique of her original results. In her *a posteriori* account, she places her own systems of ordering in view:

"I messed around with the children, words, water, Coke, peanuts, bottles, bowls, bean balances, tape recorders, translators, transcriptions, index cards, tabulations of numbers, and so on, ordering them all into an almost smooth operation. Nothing would have happened without my energy, my organising, my bringing and carrying, my telling others to do this and to do that, my arranging by putting this here and that there, saying this and that with a zealous and obsessive bossiness." [50, p. 146].

For our purposes, this recognition of her own work achieves two important results. First, it acknowledges that ways of knowing are never outside of the work of ordering. In the original experiment, the work of ordering the conditions: of placing subjects in front of tables; objects into other objects; recording machines in close proximity; interviewers posing questions; researchers bossing obsessively; etc. were necessary by-products in eliciting the strategies children use to generalise, but crucially not worthy of mention in reporting the results. Thus, embedded in the practical work of doing science are its epistemic underpinnings, yet these are carefully kept

separate [also see 52]. As Verran succinctly puts it: “[t]he endless messy mediating ordering work must not pollute the delicate separating” [50, p. 152].

Her *a posteriori* commentary consequently serves to shift her and her orderings/knowings into the frame of analysis. The ordering of the conditions become self-evidently bound up with a system of knowing—first and foremost of science as a foundational epistemology. Also, they show from the outset that taken as given were the divisions between knowing, knower and matter: the ontological supposition that knowing is separate from body/thing. This outside-inside move may on the face of it seem trivial, but what it draws attention to is our own participation in the ongoing figurations of knowing and being. It reveals that despite our best efforts, we always are and always have been “inside”, busying ourselves in ordering and dividing the many “in heres” from “out theres” [see 3].

The second implication of Verran’s insertion of herself into the frame teases this out a little further. The point she makes is that the continual figuring—the bringing about of some way of ordering—is not achieved through the separation of the experimenter from the subject; the subjects from the objects; the English-speakers from the Yoruba-speakers; “in here” from “out there”. Quite the opposite. She writes of it as “the collective going-on that was my experiment...” [50, p. 159]; the ordering of the world is, as a consequence, situated right there, “going-on” set amongst all the people and things involved in the experiment, and an emergent feature of their specific and contingent arrangement.

To offer another view on this, let us return for a moment to my visit to Dharavi and my conversation with my entrepreneurial informant. My reply to his question was that, yes, hanging around and asking questions was, indeed, the only job I had. This was the source of both immediate consternation and laughter for my informant as well as his family. I suspect similar reactions would have probably been provoked if I had been foolhardy enough to convey my unease and discomfort with the dirt and smells of the slum, and with the proximity of the dwellings to the flows of effluent. I can imagine the family thinking how simple life must be back there with one job, and how pedantic my divisions seem between clean and dirt (the sacred and the profane [see 16]). Life here in Dharavi, they might contemplate, is so much more complicated, so much more complex.

This is, of course, mere speculation. The issue I want to illustrate, however, is that, as in Verran’s case study, if we pay careful attention to the situations we are in, it is possible to catch sight of the ways that we all collectively busy ourselves enacting an “out there”, drawing lines, separating and re-joining. Everywhere, we see the ongoing and unremarkable assemble of machinery, amassed to as neatly as possible see the world in terms of networks, differences and complexities, amongst many other things. It is through our actual routine orderings, as Verran explains, “a vast amount of irrelevant complexity is excluded, and momentarily, ongoing collective life becomes extremely simple” [50, p. 159]. It is these mo-

ments of collective going-on, of mutually enacted orderings, that Verran teaches us we must place ourselves into (inside of), and that we must treat with concern and care.

GOING-ON

These latter points, especially, are complicated to convey as well as hold in view. To close, let me try, however, to summarise the points I have developed above. I’ll then draw out why I think they are of importance to HCI and how they get us to a position from which we might go on.

As I set out above, my main intention in this paper has been to think about the turning of HCI’s gaze “out there”. Specifically, I’ve sought to consider the ways we might deepen and complicate this turn through three main themes. First, I’ve argued we must be mindful of using disciplinary tropes such as networks. That is not to say the network is the only trope we are guilty of deferring to. Nor is it to deny the network as an important topic of concern and/or framing device. Rather, I’ve wanted to remind the reader that we bring certain ways of ordering to the world when we cast ourselves “in here”, looking “out there”.

I’ve also suggested we be careful about claims of difference and that we aim to better understand what we may be doing by making-strange some of the practices we observe “out there”. I understand that reasserting the lines between us, “in here”, and them, “out there”, does a particular kind of work in HCI, namely it offers a reminder to a largely Euro-American audience that people in different places do things differently. My point, though, is that this is still a making-different in terms of our own foundational ideas of organising and knowing the world; in seeing difference “out there”, from here, “... it stabilizes necessary separations by superficial reconciliation.” [50, p. 145].

Lastly, I’ve considered the ways we draw lines between the many different humans and things “out there” and, by doing so, enact complexity. What I’ve hopefully demonstrated is that this complexity (amongst other things) is something that is emergent. The collective assemblies of people and things in any space/time continually organise the world to both enact phenomenon like complexity and then do work to order it. Thus, looking “out there” from “in here”, we are not outside of those processes. Complexity, in short, is a work-in-progress, and we are embedded in that work.

To give these points a greater purchase in HCI, I tentatively outline what I’ve chosen to call three orienting frames. I say tentatively because I’m conscious they will not prescribe a concrete approach or method to the issues I’ve discussed. Nor do they circumscribe a tidy or workable model of social settings. The aim here is to present them in the manner of going-on, of leaving room for more, much more, to come.

Right there

The first of my orienting frames takes up the idea of collective orderings. Again, by collective orderings I refer to the in-just-that-moment assemblage of people and things that enact just-

that-way-of-seeing/understanding the world. My proposal is that we work to turn the network inside out, so that it is not just our ways of ordering we rehearse, but we attend to the orderings as they are achieved “right there” on the ground. Crucially, and to persist in looking from the inside out, I also mean to situate our own practices and rituals inside of that momentary, collective assemblage. The unit of analysis should thus also include the apparatus we bring to bear in ordering “out there”. This isn’t merely a call for reflexivity, in all its various guises [see 31]. It is to recognise that we are “in there” when we shift ourselves “out there”, that we are unavoidably part and parcel of the practices and rituals of ordering.

The first of the orienting frames is thus an invitation to turn the network inside out; in turning our attention out there, I encourage us to also place what it is we do “back here” within the unit of analysis.

Collective configurations of technology

The second of the orienting frames finds inspiration in a paper Suchman [44] has written discussing the relationship between industrial research and innovation in the United States and technology uptake in developing countries. Early in the paper, she raises a number of pertinent questions:

“So one question that could animate our projects is: What are the opportunities to interrupt these asymmetric flows and redirect them? What alternative configurations of technologies and practices might then be possible? And perhaps a prior question: In what ways are these flows already, in fact, more multidirectional than the mainstream discourse of globalizing information systems would suggest?” [44, p. 139]

One reading of Suchman’s call could be to see it as a (re)articulation of transnationalism, serving to complicate the lines of globalising flows. In terms of the issues that I’ve been tackling, however, I take her thoughts to point to a recognition of and the possibilities for a collective “configuration of technologies”. I don’t consider this to be another proposal for participatory design or, for that matter, a recognition of the Global South’s artful re-appropriations of technologies originally designed in wealthy, industrialised countries. What I want to suggest is that by attending with concern and care to the mutual practices and rituals of ordering—in which “in heres” and “out theres” are continually folding into themselves—we might start to imagine technological configurations that could be incorporated into the collective going-on. This configuration of technologies would *not* be equivalent to the assemblage of “words, water, Coke, peanuts, bottles, bowls, bean balances, tape recorders, translators, transcriptions, index cards, tabulations of numbers, and so on,” that enforce an order on others. They would, instead, aim to provide practical and ordinary tools for collective ordering right here, right now.

The second of the orienting frames is thus a call to imagine human-computer systems that enrich the locally organising practices of emergent assemblies, rather than reasserting the lines between in here and out there. The question I intentionally leave unanswered is how we might situate design and HCI

in those collectively enacted logics and dialogues emerging “right here, right now”.

Instabilities

Unanswered questions lead me to the third of my orienting frames. In HCI, leaving things unanswered and still messy is often equated with messy thinking and research. However, something I see as crucial in peering “out there” is to recognise that our orderings are always collectively going-on—there are no neat, stable orders for us to report back. The networks of difference and complexity are not immutable “out theres” to be tidied up or solved; they are just the scrappy, messy and unfinished enactments of ordering that are going on. Thus, in the same way Harrison writes of the pauses, disjunctures and resistance to producing solutions in Wittgenstein’s later writings, we might also learn to be more comfortable with our own pauses and moments of going on:

“Wittgenstein will not tell us what to do, his work will not add-up, will not provide (yet) another theory. However an engagement with his work can give a different understanding of what to expect by and from an explanation and thereby intimate a different, perhaps suppler, more hospitable, way of going-on...” [21, p. 489]

The third of the orienting frames thus suggests a position from which we may apply a suppler idea of what we are hoping to achieve by looking “out there”. Our accounts and explanations might allow for the unsettling of what we know, why we know it, and how we apply it; we might find ways to leave complexity just as it is.

CONCLUSION

I’m conscious in closing that I could reasonably be accused of conflating themes such as transnationalism, globalisation, postcolonialism, and networks, and choosing from what are, on the face of it, a motley collection of arguments to make my points. I also think there are reasonable grounds for accusing me of armchair theorising, intellectually posturing in ways that detract from what are without doubt some very real and practical issues “out there”. “How”, it might be fairly asked, “is this helping?” In conclusion, I thus want to open up my thoughts to a wider discussion in the hope of explaining why these possibly confusing and seemingly esoteric matters are of importance as HCI shifts its gaze further afield.

Something I’ve tried to convey in the points above is the trouble fields like anthropology and sociology run into when they set out to describe and account for the world using their own existing theories and concepts. In short, I’ve suggested this can lead to confusion over the substance and purpose of the work: whether it succeeds in describing what, exactly, is going on in a setting or whether it is, instead, engaging in some protracted disciplinary dialogue. Often the latter is confusingly presented as the former.

In its efforts to investigate “out there”, I’ve argued that HCI runs the risk of repeating this same confusion. I’ve borrowed on old and new arguments alike to suggest that the reference to

networks and the related themes of difference and complexity in HCI speak to the conceptual apparatus mobilised in certain areas of sociology, anthropology, etc., and is thus in danger of losing sight of or worse still misrepresenting the phenomena it seeks to report on and design for.

My wish here, however, is not to doggedly dismiss *a priori* theory or to question the value of importing concepts from other disciplines. Such a perspective is an old one in HCI that continues to have both its entrenched proponents and detractors. What I want to suggest is that the implications of the presented argument extend beyond the specific theoretical apparatus of networks and for that matter the particular issues of HCI and development/ICTD. The wider relevance, as I see it, is to disciplinary perspectives and the way that HCI as a discipline positions itself *vis-à-vis* “out there”—i.e., how it frames people who think, work, and play differently, and who have different rights and privileges. In these broad terms, I want to highlight what I see as two general lessons.

First, my hope is the above discussion points towards how we might pursue an integrity to our research as we turn to look “out there”. Hopefully, it invites us to repeatedly ask what we are accomplishing by setting up some place or people as “out there” and to question the methods and concepts we use to do so. Rather than succumbing to the urgency to identify and investigate new sites and ever-different “out theres”, and rehearsing familiar conceptual arguments because they have some disciplinary caché, we see how we might examine a world from “inside”, from “right here”. This, I want to suggest, is the broader consequence of turning the network inside out; it is an invitation to shift ourselves into the frame of analysis—where, as I have tried to argue, we have always been—and to apply care and concern for what, exactly, is going on around us.

Second, and relatedly, the above shows how we might begin to see ourselves within the processes of going on. Rather than “back here” reporting “out there”, it gives form to an HCI that situates itself inside of the on-going interactions between humans and humans, humans and machines, machines and machines, etc. This is not a rehearsal of participatory design where the user is the designer, thereby democratising the design process. The call is a broader and more fundamental one that recognises the mutual, unfolding enactments of ordering, classifying, producing and ultimately designing technology. This collapses the us-them, human-machine, inside-outside binaries and allows us to see technology and its design not as a recapitulation of disciplinary tropes or tidy conceptual categories, but as a means of participating in unfolding ways of knowing, being and doing. The lesson here then is to recognise our inextricable participation in these enactments, to see that we to are part and parcel of just those human-computer interactions we are studying and designing for.

How then is this helping? As Gary Marsden—deservedly honoured by SIGCHI for his contribution to research in development—once put to me, “I just want to make people’s lives better”. I couldn’t agree more with Gary’s sentiment. And yet,

I find myself struggling with what this better might be. How will we know it when we see it, and how will we know who’s better it is? If we might momentarily look beyond this paper’s conceptual meanderings, my hope is that at the very least it offers a basis for asking more questions, challenging our own practices and, in turning our attention “out there”, keeping an eye on what we are doing “right here”.

ACKNOWLEDGMENTS

I am indebted to many kind friends and colleagues for reading drafts of this paper. Listing their names hardly does justice, but I hope it is some recompense for their time and thoughts. Many thanks to Barry Brown, Richard Harper, Lara Houston, Lucian Leahu, Kenton O’Hara, Nimmi Rangaswamy, Daniela Rosner, Laurel Swan and Janet Vertesi.

REFERENCES

1. Anderson, W. From subjugated knowledge to conjugated subjects: science and globalisation, or postcolonial studies of science? *Postcolonial Studies*, 12, 4 (2009), 389-400.
2. Anderson, W. and Adams, V. Pramoedy’s Chickens: Postcolonial Studies of Technoscience. In E. Hackett, O. Amsterdamska, M. Lynch and J. Wajcman (Eds.), *The Handbook of Science and Technology Studies*. MIT Press, London, 2007, 181-204.
3. Barad, K. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Duke University, London, 2007.
4. Bardzell, S. Feminist HCI: taking stock and outlining an agenda for design. In *Proc. CHI ’10* (Atlanta, GA, 2010). ACM, NY, NY, 1301-1310.
5. Bell, G. No More SMS from Jesus: Ubicomp, Religion and Techno-spiritual Practices. In *Proc. Ubicomp ’06 (Berlin, 2006)*. Springer-Verlag, Heidelberg, Germany, 141-158.
6. Bell, G. Messy Futures: culture, technology and research. *Keynote address, CHI ’10* (Atlanta, GA, 2010). ACM, NY, NY.
7. Bell, G. and Dourish, P. Yesterday’s tomorrows: notes on ubiquitous computing’s dominant vision. *Personal Ubiquitous Computing*, 11, 2 (2007), 133-143.
8. Bidwell, N. J., Reitmaier, T., Marsden, G. and Hansen, S. Designing with mobile digital storytelling in rural Africa. In *Proc. CHI ’10* (Atlanta, GA, 2010). ACM, NY, NY, 1593-1602.
9. Bødker, S. When second wave HCI meets third wave challenges. In *Proc. NordiCHI ’06* (Oslo, Norway, 06). ACM, NY, NY, 1-8.
10. Brewer, E., Demmer, M., Ho, M., Honicky, R. J., Pal, J., Plache, M. and Surana, S. The Challenges of Technology Research for Developing Regions. *IEEE Pervasive Computing*, 5, 2 (2006), 15-23.
11. Button, G. and Sharrock, W. The production of order and the order of production: possibilities for distributed organisations, work and technology in the print industry. In *Proc. ECSCW ’97* (Lancaster, UK, 1997). Kluwer Academic, Dordrecht, NL, 1-16.
12. Churchill, E., Dray, S., Elliott, A., Larvie, P. and Siegel, D. Addressing challenges in doing international field research. In *Proc. CHI EA ’10* (Atlanta, GA, 2010). ACM, NY, NY, 3127-3130.
13. Dantec, C. A. L. and Edwards, W. K. Designs on dignity: perceptions of technology among the homeless. In *Proc. CHI ’08* (Florence, Italy, 2008). ACM, NY, NY, 627-636.
14. Dantec, C. A. L. and Edwards, W. K. The view from the trenches: organization, power, and technology at two nonprofit home-

- less outreach centers. In *Proc. CSCW '08* (San Diego, CA, 2008). ACM, NY, NY, 589-598.
15. de Laet, M. and Mol, A. The Zimbabwe Bush Pump: Mechanics of a Fluid Technology. *Social Studies of Science*, 30, 2 (2000), 225-263.
 16. Douglas, M. *Purity and Danger*. Routledge, London, 2002.
 17. Dourish, P. Implications for design. In *Proc. CHI '06* (Montréal, Canada, 2006). ACM, NY, NY, 541-550.
 18. Dray, S. M., Siegel, D. A. and Kotzé, P. Indra's Net: HCI in the developing world. *Interactions*, 10, 2 (2003), 28-37.
 19. Gitau, S., Marsden, G. and Donner, J. After access: challenges facing mobile-only internet users in the developing world. In *Proc. CHI '10* (Atlanta, GA, 2010). ACM, NY, NY, 2603-2606.
 20. Harper, R., Procter, R., Randall, D. and Rouncefield, M. 'Safety in numbers': calculation and document re-use in knowledge work. In *Proc. GROUP '01* (Boulder, CO, 2001). ACM, NY, NY, 242-251.
 21. Harrison, P. The Caesura: remarks on Wittgenstein's interruption of theory, or, why practices elude explanation. *Geoforum*, 33, 4 (2002), 487-503.
 22. Harrison, P. "How shall I say it...?" Relating the nonrelational. *Environment and Planning A*, 39, 3 (2007), 590-608.
 23. Harrison, S., Tatar, D. and Sengers, P. The three paradigms of HCI. In *Proc. alt.chi, CHI '07* (San Jose, CA, 07). ACM, NY, NY.
 24. Heath, C. and Luff, P. Documents and professional practice: "bad" organisational reasons for "good" clinical records. In *Proc. CSCW '96* (Boston, MA, 1996). ACM, NY, NY, 354-363.
 25. Irani, L., Vertesi, J., Dourish, P., Philip, K. and Grinter, R. E. Postcolonial computing: a lens on design and development. In *Proc. CHI '10* (Atlanta, GA, 2010). ACM, NY, NY, 1311-1320.
 26. Kam, M., Dray, S., Toyama, K., Marsden, G., Parikh, T. and Cutrell, E. Computing technology in international development: who, what, where, when, why and how? In *Proc. CHI EA '10* (Atlanta, GA, 2010). ACM, NY, NY, 3135-3138.
 27. Latour, B. Visualization and cognition: Drawing things together. In M. Lynch and S. Woolgar (Eds.), *Representation in scientific activity*. MIT Press, Cambridge, MA, 1990, 19-68.
 28. Latour, B. *Pandora's Hope: Essays on the Realities of Science Studies*. Harvard University Press, Cambridge, MA, 1999.
 29. Law, J. *After Method: Mess in Social Science Research*. Routledge, London, 2004.
 30. Law, J. and Hassard, J. *Actor Network Theory and After*. Blackwell Publishing, London, 1999.
 31. Lynch, M. Against reflexivity as an academic virtue and source of privileged knowledge. *Theory, Culture & Society*, 17, 3 (2000), 26.
 32. Marsden, G. UNDER DEVELOPMENT: The six habits of highly effective "humanitarian" projects. *Interactions*, 16, 5 (2009), 36-39.
 33. Miner, H. (1956). Body Ritual among the Nacirema. *American Anthropologist*, 58(3), 503-507.
 34. Oyugi, C., Nocera, J. A., Dunckley, L. and Dray, S. The challenges for participatory design in the developing world. In *Proc. PDC '08* (Bloomington, IN, 2008). Indiana University, 295-296.
 35. Parmar, V., Groeneveld, G., Jalote-Parmar, A. and Keyson, D. Tangible user interface for increasing social interaction among rural women. In *Proc. TEI '09* (Cambridge, UK, 2009). ACM, NY, NY, 139-145.
 36. Riles, A. *The Network Inside Out*. The University of Michigan Press, Ann Arbor, MI, 2001.
 37. Riles, A. The anti-network: Private global governance, legal knowledge, and the legitimacy of the state. *American Journal of Comparative Law*, 56(2008), 605-630.
 38. Sambasivan, N., Cutrell, E., Toyama, K. and Nardi, B. Intermediated technology use in developing communities. In *Proc. CHI '10* (Atlanta, GA, 2010). ACM, NY, NY, 2583-2592.
 39. Sambasivan, N., Rangaswamy, N., Cutrell, E. and Nardi, B. Ubicomp4D: infrastructure and interaction for international development--the case of urban indian slums. In *Proc. Ubicomp '09* (Orlando, FL, 2009). ACM, NY, NY, 155-164.
 40. Sawhney, N. Voices beyond walls: the role of digital storytelling for empowering marginalized youth in refugee camps. In *Proc. Conference on Interaction Design and Children* (Como, Italy, 2009). ACM, NY, NY, 302-305.
 41. Smyth, T. N., Kumar, S., Medhi, I. and Toyama, K. Where there's a will there's a way: mobile media sharing in urban india. In *Proc. CHI '10* (Atlanta, GA, 2010). ACM, NY, NY, 753-762.
 42. Strathern, M. Cutting the network. *Journal of the Royal Anthropological Institute*, 2, 3 (1996), 517-535.
 43. Strathern, M. *Partial Connections*. Rowman & Littlefield Publishers, Oxford, 2004.
 44. Suchman, L. Practice-based design of information systems: Notes from the hyperdeveloped world. *The Information Society*, 18, 2 (2002), 139-144.
 45. Suchman, L. A. *Human-Machine Reconfigurations: Plans and Situated Actions*. Cambridge University Press, Cambridge, 2007.
 46. Taylor, A. S. and Swan, L. Artful systems in the home. In *Proc. CHI '05* (Portland, OR, 2005). ACM, NY, NY, 641-650.
 47. Taylor, N. and Cheverst, K. Social interaction around a rural community photo display. *Int. J. Hum.-Comput. Stud.*, 67, 12 (2009), 1037-1047.
 48. Thrift, N. The place of complexity. *Theory, Culture & Society*, 16, 3 (1999), 31-69.
 49. Tsing, A. The global Situation. *Cultural Anthropology*, 15, 3 (2000), 327-360.
 50. Verran, H. *Science and an African Logic*. University of Chicago Press, London, 2001.
 51. Williams, A., Anderson, K. and Dourish, P. Anchored mobilities: mobile technology and transnational migration. In *Proc. DIS '08* (Cape Town, South Africa, 2008). ACM, NY, NY, 323-332.
 52. Winch, P. Understanding a Primitive Society. *American Philosophical Quarterly*, 1, 4 (1964), 307-324.
 53. Woodruff, A., Augustin, S. and Foucault, B. Sabbath day home automation: "it's like mixing technology and religion". In *Proc. CHI '07* (San Jose, CA, 2007). ACM, NY, NY, 527-536.
 54. Wyche, S. P., Hayes, G. R., Harvel, L. D. and Grinter, R. E. Technology in spiritual formation: an exploratory study of computer mediated religious communications. In *Proc. CSCW '06* (Banff, Canada, 2006). ACM, NY, NY, 199-208.
 55. Wyche, S. P., Magnus, C. M. and Grinter, R. E. Broadening UbiComp's vision: an exploratory study of charismatic pentecostals and technology use in Brazil. In *Proc. Ubicomp '09* (Orlando, FL, 2009). ACM, NY, NY, 145-154.
 56. Wyche, S. P., Smyth, T. N., Chetty, M., Aoki, P. M. and Grinter, R. E. Deliberate interactions: characterizing technology use in Nairobi, Kenya. In *Proc. CHI '10* (Atlanta, GA, 2010). ACM, NY, NY, 2593-2602.