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Toward an Ethnography of Friction and Ease in Complex Systems

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The stuff we ethnographers help to create is becoming more socially and technologically complex. Despite this, ethnographic practice in industry largely continues to rely on conceptual frameworks that favor relative simplicity. This paper describes our multi-year collaboration to develop a set of concepts and resources to support complexity- and systems-oriented thinking in design ethnography. Drawing on our own experiences as practicing anthropologists, we explore some of the ways in which three "frictions" hinder systemic thinking in user-centered design research. These are the frictions of availability, dissonant knowledge, and entrenched praxis. Against these, we argue for a broader, systems-sensitive approach to industry ethnography—one that seeks to understand both friction and ease for a wider range of human subjects and settings than are usually considered. Guided by perspectives from the social sciences and industry, as well as our own experience, we suggest turning our inquiry toward systems-situated phenomena, exploring, specifically: interconnectedness, synthesis, and emergence. We then describe our own foray into "user ecosystem thinking," a practical, experimental framework for applying a systems-sensitive approach to research and design. Keywords: systems, ecosystem thinking, users, complexity

INTRODUCTION

Several years ago, we began collaborating on some ideas and tools that we hoped could help us fill a void that we'd been feeling in our practice and projects as design researchers. We eventually gave our pursuit a name: user ecosystem thinking. This name, for us, seemed to capture a great deal of what we felt to be missing—a deliberate, structured way of thinking about the complex, often-disregarded, interlinkages between people and their engagements with products and services. These complex interconnections (which we will describe below) have usually played some partial role in our understanding of what we've been able to observe and examine in our fieldwork—but our projects, typically focused on specific types of users or other perceived value-creators, rarely afforded us the luxury to give these broader social connections significant thought.

In this paper, we trace some of our journey and collaboration toward user ecosystem thinking. We begin by outlining ways in which industry ethnography, as user-centered research, tends to frame our attention and action around specific types of human subjects and their seemingly isolated engagement with products and services.[1] In doing this, our ethnographic work often hides or elides other relevant subjects and blurs interconnected relationships within complex systems of subjects and artifacts. We use the metaphor of *friction* to lay out three interrelated forces which we have observed as constraints in our own practice. These are the *friction of*

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availability, the *friction of dissonant knowledge*, and the *friction of entrenched praxis*. We then turn to systems theory and discuss how the key concepts of *interconnectedness*, *synthesis*, and *emergence* provide helpful anchor points in resisting these three frictions, rather than reproducing them. Finally, we describe our own experimental approach—user ecosystem thinking—a revised perspective on the concepts of "users" and "use." The approach is backed by a broad typology of "archetypical" user relationships, and operationalized via a card deck and structured, card-based brainstorming activities that we've found very effective in classrooms, workshops, and in our own project work.

THE PROBLEM AS WE SEE IT

Day by day, the stuff we industry ethnographers help to create is becoming exponentially more complex in its social interpolations and functions. Today's pervasive, far-reaching products and services touch ever-widening ecosystems of people and things, with social and environmental implications that are often far outside our view. One person's use of a social media platform can have cascading implications for dozens or millions of other people. Similarly, one person's experience of a plastic water bottle on a hot day in Chicago is not just shaped by the person who packed it, or shipped it, or brought it home and chilled it in the refrigerator, but also, in turn, shapes the experience of the person who sorts the bottle at a recycling facility or finds it floating near a garbage barge on the other side of the planet. Our interactions and experiences with products and services are less one-to-one between subject and object, and more many-to-many between multiple subjects and multiple objects, knowingly and unknowingly tethered together in an experiential web. With the rapid advancement of artificial intelligence and associated technologies, this trendline toward complexly intertwined social implications appears poised to turn ever-steeply upward.

Contrast this entangled, multiply contingent, "white water world" (Pendleton-Julian & Brown, 2018) with the classic, ubiquitous industry fieldwork photos of individual people interacting with a product—or perhaps seated at the kitchen table telling stories of their product experiences. These simple subject-object representations are in disjunction with some core realities: a growing number of people who encounter products, services, and other industrial artifacts experience them in ways that may be *in*direct, passive, *un*intended, *un*desired, *un*conscious, or far afield in space or time. Moreover, these experiences don't occur in isolation; they are shaped, enabled, or constrained by the encounters and experiences of other people, knowingly or unknowingly networked together in a complex ecosystem of people and artifacts.

As ethnographers in industry, our mandate is often to discover opportunities to simplify or enhance people's experiences with products and services; to snoop out friction and imagine opportunities for seamlessness and ease. This generally involves

some version of qualitative research with small numbers of "users," typically conceived as subjects who interact with products and services in relative isolation from broader local or global systems. This is a deficient model, in need of retooling. We see a growing incongruence between conventional "user"-centered approaches in industry and the complex, multi-dimensional systems of interconnected behaviors and experiences within which individual user experiences reside. In short, we argue that ethnographic praxis in industry has overwhelmingly come to conceptualize the human subjects of our research, and the contexts of their behavior and experience, in ways that are no longer appropriate in a world of increasing social and technological complexity—if, indeed, they were *ever* appropriate.

Our concern is deeply rooted in both early foundational and contemporary ethnographic theory. 20th century sociocultural anthropologists such as Franz Boas, Margaret Meade, Gregory Bateson, and Clifford Geertz laid foundations for understanding the complex interconnections between people and the various ways they engage artifacts and each other. More recent anthropological contributions suggest that we look at these engagements as complex activity systems, comprising an array of networked actors, including non-human actors, many of whom are not readily visible (see Adams, 2023; Hutchins, 1995; Latour, 2007; Mol, 2002). At odds with these systems-sensitive perspectives, the prevailing research perspective in industry, advanced and reproduced, in part, by practicing ethnographers, reinforces the tendency to view users in terms of simple subject-object relationships. That is, to frame human users of goods and services as "subjects" (in the grammatical sense) who have direct, active, and intentional experiences with the tangible and intangible "objects" that researchers and designers help to create.

We became uncomfortably aware of this disjunction through difficult moments of friction in our own professional practices as design anthropologists. These were instances where we discovered blind spots built into our industry-based research—causing us to either overlook crucial systemic contexts and relationships or have difficulty communicating about them effectively with our clients and colleagues. (More on this later.)

This is not an ivory tower lamentation about academic, long-form ethnography being forced into short, applied sprints and thus losing its soul. Nor do we mean to grouse about researchers without backgrounds in cultural anthropology embracing ethnography and applying its methods—on the contrary, we see the diversity of professional pathways into industry ethnography as a source of its success and vibrancy. While we are both cultural anthropologists by training, we also both have long-running careers doing applied research as consultants or in-house researchers with for-profit and not-for-profit organizations in a variety of sectors. We thus recognize that there are purposeful differences between academic and applied research, and that applied research is not inherently limited, nor inferior to academic work. What we *are* suggesting is that the ways we in industry research have come to typically conceptualize "users," and the relevant forms and contexts of their

experiences, may be leading us to suboptimal understandings and insights about what's really going on.

In a very real sense, we are talking about power, and the ways in which "user-centered," "human-centered," and related design methods and philosophies become a discourse. Here we mean discourse in the Foucauldian sense; that is, as an interconnected set of ideas, language, and practices that help to produce and *reproduce* what they purport to merely describe (Foucault, 1969). In other words, the way we study and represent users in our work does not merely describe users, their behavior, and experiences, but also constitutes them in our minds and confines the ways we and others are able to think of them. This discursive implication of user-centeredness, as we've seen it operate in research for industry, requires exploration not only into its real effects on research and design, but also how it is shaped by and, in turn, helps to reproduce, certain dimensions of social power. But we don't propose that taking a user-centered approach in applied research is, in itself, a bad thing. In this, we are aligned with anthropologist James Ferguson, who reminds us that the analysis of ideas must not be merely an inquiry into their rightness or wrongness, but rather to ask, "what do they do, what real social effects do they have" (1994, p.xv, italics in the original). Accordingly, the important question for us is, what are we ignoring, or helping to reproduce, when we put this approach to design ethnography into practice? Are there underlying structural assumptions or incentives that we are letting inform or distort our work? And, if so, how can we become more aware of these, or even find new ways of working?

THREE TYPES OF "FRICTION'

The problem, as we understand it, can be usefully examined through the lens of friction and its ease. Whose friction gets attention by ethnographers in industry? And for whom or what and where do ethnographers help to design ease? Further extending the metaphor, we suggest that the work of industry ethnography is constrained by its own frictions—three in particular—that shape our response to these questions and challenge our ability to reflect on them more fully. These are the friction of availability, the friction of dissonant knowledge, and the friction of entrenched praxis.

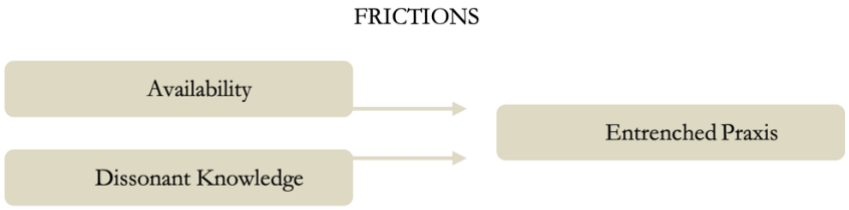

Fig. 1. The frictions work together to create a state of ethnographic praxis that lags behind reality.

The Friction of Availability

In industry ethnography there's broad agreement that a good product or service is one that understands its users. This is typically linked to a tacit understanding that users are *valuable*. As such, when we refer to users, they are typically customers or other embodiments of business value such as employees, contractors, or suppliers. These are the "users" who most readily come to mind. This simple conflation of users and perceived value to industry is fundamental to what we're calling the friction of availability. By "availability," we refer to what cognitive psychologists Amos Tveresky and Daniel Kahneman (1974; cf. Kahneman 2013) call the "availability heuristic"—the idea that humans gravitate toward what's most cognitively in ready reach, or top of mind, when thinking about something inherently more nuanced and complicated.

For ethnographers, this friction of availability can nudge us to focus on users who we and our stakeholders can most easily conceptualize as important and valuable. But it's more pervasive than that. It can also cause us to focus on the places and communities that we can most easily conceptualize as relevant to industry interests, and in the time frames that we can most readily conceptualize as appropriate for a return on the investment in our research. We assume that directing our attention further away from these loci will result in diminishing returns. But this centering on the most visible sites of value can sometimes lead us away from considering many other potentially important customers or stakeholders in the larger ecosystem of people who encounter what we help to create. While we might recognize that these other people, contexts, and temporalities are out there, for the most part we let ourselves focus on those users and encounters that we can already envision as relevant.

One way to think about the friction of availability is as a behind-the-scenes force that helps determine (mostly unconsciously to us) who and what we pay attention to when we're designing, conducting, and analyzing research. There are of course other, more visible factors as well—for example the necessity of managing research budgets and time. Although industry budgets are often large compared to academic research (and this is true of many foundations, non-profits, and public-sector agencies as well), itemized costs of doing industry ethnography add up quickly. Industry researchers (unlike academic researchers) typically hire recruiting services, pay informants, and rack up large travel costs to visit multiple field sites. Hence, the incentive is normally to keep budgets reigned in, field site selections optimized, and—critically—breadth and scope of inquiry confined to what are perceived to be the highest value returns. But while these are all understandable considerations, we also see unconscious bias, driven by friction, at work as well.

Speaking personally, we have been aware of the friction of availability in our own work on many occasions. Here's an example: some years ago, Youngblood was commuting on a train in which, several seats ahead, a stranger was conversing very loudly into his cell phone. Many minutes into the man's conversation, Youngblood

heard a fellow passenger gripe aloud for others to hear, "There should be a way to make that guy stop using his phone." To which another rider responded, "There should be a way for *all of us* to stop using his phone!" This was just an offhand exchange of witticism between fellow commuters—but Youngblood was struck. In recent years, he had been part of multiple user research projects focused specifically on cell phone users. In those projects, never had it occurred to him to think of passive bystanders as "users" of other people's mobile phones. He and his collaborators had focused diligently on the characteristics, behaviors, and expectations of *direct* cell phone users (like the loud-talking stranger) with the goal of designing a phone that could enable wonderful experiences for those users. In doing so, they had completely neglected to consider all the different people around those direct users who might also experience those phones. Thinking back, Youngblood reflected on how these projects got defined and scoped. Everyone involved had assumed that a focus on the obvious, direct users made the most sense and could have the greatest impact for design. It wasn't that Youngblood had been reluctant to speak up and advocate for other areas of inquiry—rather, he had been operating under the same set of unconscious assumptions as everyone else, feeling the pull of the friction of availability.

This highlights an important challenge: our stakeholders' assumptions about appropriate areas of focus in research often become *our* assumptions as well, because they lead us to invest our effort and imagination where we know our stakeholders will see value. We want to write proposals that win acceptance, to execute research that seems targeted and efficient, and to be able to point to clear, valuable results. Thus, we can fall into habits of proposing and practicing research that asks mostly top of mind questions to serve mostly top of mind objectives. In this way, we may even be teaching our clients and collaborators that this is what "good" user research looks like, and in doing so simply define out of the picture the possibility of broader, systems-sensitive ethnography in industry.

The Friction of Dissonant Knowledge

While the friction of availability influences what we *tune in to*, a second force, the friction of dissonant knowledge, influences what we tune *out from*. The two frictions can have similar effects on our work, though they are somewhat different. The friction of dissonant knowledge can influence our bias toward certain ideas and information even when other ideas and information are readily available. This friction is often at play when we reign in oddball interpretations or filter out data that feel too far off or too different from knowledge we already believe to be of worth and utility.

An important role of an ethnographer, or any sort of researcher, is to facilitate new understandings. A fundamental challenge to this role is that it can be very difficult to shift ideas away from, or even poke at, long-held paradigms. This is, in part, because our questions and answers themselves tend to be "paradigm-

determined" (Kuhn, 1962, p.216). The friction of dissonant knowledge reinforces this paradigm determinism in research.

One way it does this is by easing friction when we play to the paradigm, rather than against it. Setting ourselves up for success often entails, consciously or subconsciously, emphasizing what our stakeholders will be equipped to digest and able to fit, without too much discomfort, into their existing frames of understanding. In doing so, we may ignore or suppress that which is indigestible or doesn't fit. (This can be the case even when we present our work product as a "reframe" for our stakeholders.)

The friction of dissonant knowledge can also reinforce existing paradigms by *increasing* friction when we try to resist it. This is especially true with paradigms that sustain existing structures of power. This, for instance, can make it difficult for us to clearly, compellingly argue for unconventional research settings or articulate more challenging insights associated with people not normally considered users, customers, or some other human loci of perceived value. Chesluk experienced this firsthand, in one of his early projects as a practicing anthropologist, while presenting research findings to a client on the design of surgical tools. Chesluk's observations in operating rooms around the world had led him to question the client's singular focus on surgeons. He had seen that many technicians, nurses, and others were responsible for setting up and managing the devices before, during, and after each surgery; each person had to successfully use the devices in their own way to fulfill their roles and make the procedure a success. This had been easiest for Chesluk to observe in the negative—in instances where the wrong device had been brought from inventory, or the device had been set up incorrectly, or wasn't ready at the moment the surgeon needed it—but he struggled with how to include this in his presentation. When he started to describe these other users, someone from the client C-suite interrupted and asked, "What am I supposed to be learning from this?" At which point, Chesluk's boss deftly took control of the presentation and transitioned it back to findings about surgeons.

Of course, Chesluk's clients understood that other people handled their devices; the dissonance was due to their existing frame of understanding, in which surgeons make the decisions about which devices they will use and which devices hospitals will purchase. In this framing, surgeons are the relevant users because they are the customers. Thinking back on this experience, it seems clear that a better set of conceptual and linguistic tools could have been helpful. Even if the project's clients were potentially ready to learn something about people other than the surgeons, Chesluk couldn't effectively articulate his findings in a way that could overcome this friction.

Sometimes when we or our stakeholders resist dissonant ideas and information it seems to come from an unconscious response to fortify our beliefs and protect them from contradiction with a sort of "self-sealing logic" (Argyris, 2012). Other times, however, the rejection of dissonance is more overtly and deliberately in service of

social power. Like us, you've perhaps had experiences working with clients or stakeholders who clearly have taboo words and formal or informal prohibitions on certain areas of inquiry. These may be relatively benign blind spots, or they may reflect dark corners of genuine or feigned ignorance wherein lie ugly or uncomfortable aspects of the business. Often, these dark corners relate to systemic harms, such as social and environmental costs of a product or service. An example: Youngblood was once in discussions with a potential client whose flagship product is notoriously and unquestionably addictive, causing harm to many customers. At the outset of the engagement, the client project lead instructed Youngblood that "addiction" and "habit" were among the multiple words that could never be mentioned in meetings or presentations. (N.B. Youngblood did not end up contracting with this organization.)

In extreme cases like this, we can perhaps see these taboos as attempts to protect a deliberate fiction or avoid the responsibility that comes with knowing. In which case, they are clear red flags for engagements that would be ethically problematic. (What's "user-" or "human-" centered about harmful products?) But the friction of dissonant knowledge is not always so simple as heads placed in the sand. Taboos, omissions, and actual models of reality can be mutually reinforcing—shaping, over time, shared ideas of what's real and what's even knowable. If we yield to these, our work may play an active part in maintaining façades—those that are dangerous as well as those that are relatively benign—reducing the space for better understanding.

What can we do differently regarding the friction of dissonant knowledge? If we run toward rather than away from the friction of dissonant knowledge, we can imagine ways to work with it. For example, thinking about Chesluk's experience and what he might have advised his younger self to do differently, he and his colleagues could have anticipated facing issues when presenting about an unexpected group of users, and found ways to frame this knowledge with less dissonance. When we are planning our projects with coworkers and clients, we can think ahead to actively seek out and address areas of dissonance. Of course, this puts the onus on us as practitioners to become aware of our own blind spots, developing our awareness of how we may be sidelining ideas or observations that are more complex and take more time and effort to understand and convey. The experimental approach that we describe later is meant to help us and our teams do just this.

The Friction of Entrenched Praxis

In some ways, the third form of friction emerges as a gestalt from the combined effect of the first two. This is the friction of entrenched praxis. By "praxis," we mean the repeated or habitual practices through which a set of ideas is put into real-world action.

The way we put "user-centered" research into practice can keep us in a familiar groove, cutting us off from methods or perspectives that might better resist the frictions of availability and dissonant knowledge. We see this in the ways in which

our tools, our research methods, and our techniques for interpreting data and envisioning solutions are all informed by the embedded subject-object theory of user-centered design and its relative insensitivity to broader systems and models of experience. What we do in the practice of industrial ethnography reinforces this theoretical orientation and helps entrench our praxis. As noted above, this is a discourse in the sense Foucault uses the term: a formation of ideas, technologies, and practices that helps to produce what it professes merely to describe. (We don't see this as particular to the world of user research; it seems entirely possible that every profession has its own version of entrenched praxis.)

Sometimes, the entrenching force can be as simple as letting the name we give to a thing come to define what we see that thing to be. This partly explains, for example, why it's so easy to understand *surgical* tools as artifacts used by *surgeons* rather than by a whole ecosystem of important users. This phenomenon of particular types of subjects getting conceptually and rhetorically linked to particular products or services is what Kris Cohen (2005) describes as "a who getting sutured to a what" (p.22) repeatedly over time until the relationship seems self-evident, of central importance, and unworthy of interrogation.

Like us, you may have noticed ways in which the work we do, and the language of our work, has entrained our minds. Concepts such as "user" and "experience," mostly under-defined and under-theorized in our day-to-day projects, direct our focus toward particular types of users and relatively well-trodden areas of investigation. Many other terms of trade in our professional practice similarly shape how we approach and execute our work. These include classic hits such as "needs," "moments of engagement," "customer journeys," and "delight," all signifying areas of user experience that are perceived to have value for industry. These are part of the language of our explicit and implicit training as practicing ethnographers, the language of our colleagues and clients, of RFPs, proposals, research plans, and insights decks. They shape the way we approach research and present what's out there in the field. We've learned this through repeated reinforcement, and we've reproduced it ourselves in the proposals, plans, and write-ups we create. The established gravity of "user-centered" thinking and practices as we know them pulls us back to the assumed centers of importance and value. This can be seen as both an effect of social power on our work as well as a way in which our work can be part of reproducing that same social power.

In our experience, we are sometimes most aware of entrenched praxis when planned research takes unexpected and fortuitous turns into new avenues. We're thinking of situations when what we have envisioned as a linear path toward a set of results surfaces something entirely unexpected that challenges our research approach and/or our hypotheses. This might happen deep into a project plan when it's difficult to change course. We have encountered this on several occasions where the nature of the product or service we were studying seemed to self-evidently point to *who* to research and how. For example, a project of Youngblood's on insulin "self-

injection" devices took a new turn when the research team was confronted with the realization that these devices are sometimes, in infrequent but critically important medical situations, deployed by caregivers or bystanders rather than by the insulin-takers themselves. This had important implications for labeling and device design to support non-adept (non-"self-injecting") users. In another project, scoped for research with college students and instructors to support the design of a "student" portal for online learning, Youngblood and team realized halfway into their fieldwork that many students relied on a broad ecosystem of other people, including mentors, family members, employers, peer allies, and other personal supporters who all helped create a student's experience. Prior to this realization, these people were not considered for significant inclusion in field research because they not "students." Once included, the team was able to envision ways that the portal could be designed for some of these other potential users—for example, to help them send encouragement to students, proofread writing assignments, and celebrate achievements through the portal. In both of these cases, realizing the larger assortment of people that were or *could be* involved in the primary user's experience had huge implications for design.

Through research experiences such as these, as well as others mentioned above, we began to recognize ways that all three of these frictions have affected our work. Moreover, we learned *from* them, as they shed light on certain challenges to moving our ethnographic practices forward. In response, we turned to various schools of systems theory to design something of our own: a practical toolkit for ourselves and others to mitigate the effect of these frictions.

TOWARD A MORE SYSTEMS-ORIENTED ETHNOGRAPHY IN INDUSTRY

As discussed above, the relatively narrow conception of user-centricity that tends to inform our research in industrial ethnography can cause us to miss opportunities that come from a broader, more systems-sensitive understanding of human encounters with artifacts. As user experiences grow increasingly global and interconnected, we are wary of the breadth of user contexts and forms of experience that risk going un- or under-explored, leaving many types of encounters and experiences with industry ethnographically invisible—in part, because these are not seen as valuable in our work. We worry about a possible future in which this ethnographic invisibility becomes an accepted norm, rendering ethnography and design increasingly "asocial"—structurally, practically, and ethically inattentive to systemic experiences and social impacts.

In other words, we are concerned that our habitual frameworks for conceiving of, understanding, and designing for our users are creating a version of reality that does not align with what's really out there. As a corrective, we argue for a broader, systems-sensitive approach to ethnography—theory and practices that seek to

understand both friction and ease more broadly for a wider range of human subjects and settings that are often not considered.

For the two of us, our efforts to envision a more systems-oriented approach for ethnography in industry has been a long (and ongoing) journey. Along the way, we have found numerous sources of inspiration in both canonical anthropology as well as emerging subfields in anthropology, design, and elsewhere where others seem to have started defining related frictions and exploring alternative approaches to the problems these can create. In anthropology, we are inspired by the subfields of cognitive anthropology, such as Edwin Hutchins' work on "distributed" cognition (1995; cf. Hollan et al, 2000; Hazlehurst et al, 2003), as well the anthropology of science, especially actor-network-theory following the work of Bruno Latour (2007) and others. These perspectives offer ways to reconceive some of the situations mentioned above—for example, in Youngblood's story about cell phone use, actor-network-theory could have helped him frame contexts and experiences of phone usage more socially, with cell phones, their direct users, bystanders, and others all playing roles in an experiential system.

More squarely in design, we've learned much in particular from two streams of work. First, the field of service design, with its insistence on understanding not just the end user experience of a product or service but the larger system of people, organizations, and processes that are needed to make that product or service possible, effective, and beneficial (see, e.g., Stickdorn & Schneider, 2011)). We've also been influenced by the multi-disciplinary work of Batya Friedman and David Hendry on value sensitive design (2019). This work centers on a technology's positive or negative impacts on different types of stakeholders throughout social systems, measuring these impacts against commonly shared human values. Friedman and Hendry see "users" as one type of stakeholder, but also consider the implications of design for "indirect" stakeholders, including future generations. Both of these emerging design practices and perspectives could have helped reframe Chesluk's story about non-surgeon device users—presenting the experience of nurses and others as a service improvement opportunity or a key stakeholder consideration could have helped convey the importance of these other users to his clients.

Our own experimental approach and toolkit borrows from these theories and practices. One thing that is common across these literatures is a systems-oriented approach to sense-making. In each of these, we see some emphasis on three key concepts that systems theorist Donella Meadows (2008) and others have given us language to think with: *interconnectedness*, *synthesis*, and *emergence*. These lenses on "what's going on" offer a solid construct for counteracting some of the frictions in industry ethnography. They facilitate new perspectives on entrenched ideas about "users," "use," and "user experience," and they point toward new ways of thinking about the societal and environmental contexts into which industry inserts its

influence and, intentionally or unintentionally, effects friction or ease for people who come into contact with its products and services.

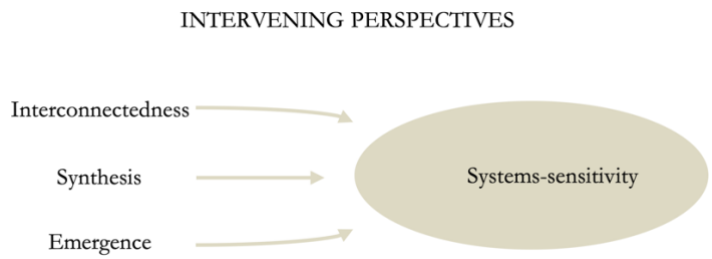

Fig. 2. The concepts of interconnectedness, synthesis, and emergence provide a foundation for systems-sensitive ethnography in industry.

The idea of *interconnectedness* points to webs of interactions and impacts beyond self-evident, top-of-mind subjects and contexts. It reminds us not to focus too narrowly on specific types of human subjects, but rather to explore ways that a range of subjects (human and nonhuman) and objects (human and nonhuman) are connected to each other through linked behaviors and experiences. Youngblood's phone user experience illustrates how we as design researchers are often told (and/or tell ourselves) to focus primarily on individual users and their experiences. An interconnectedness perspective helps illuminate more complex intersections between people and artifacts.

Synthesis points to the interdependency of all systemic elements, human and nonhuman, proximate and distant. It reminds us that these linkages are mutually influential and may vary greatly in their intentionality, visibility, or proximity in space and time. Earlier in this paper we noted how one person's use of social media or bottled water shapes, and is shaped by, the behaviors and experiences of other people even on the other side of the planet or many years later. This is synthesis.

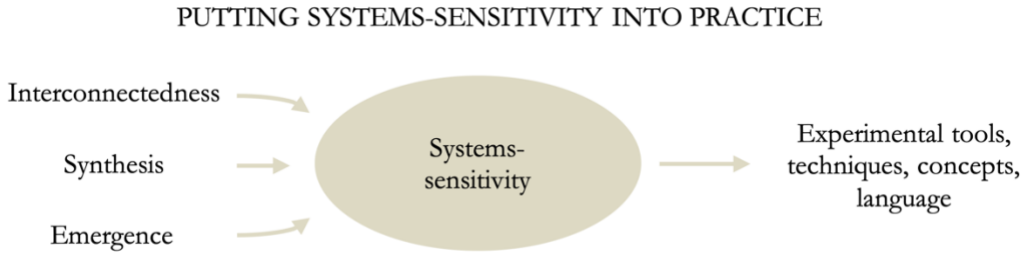

Fig. 3. Creating more systems-sensitive tools, concepts, and language for industry ethnography supports experimentation with systems-sensitive methods and approaches.

The third systems perspective, *emergence*, points to the generation and perpetuation of systemic outcomes; that is, what the parts of a system do together

that they wouldn't do alone. Emergence reminds us to explore ways in which webs of interconnected, interdependent relationships operate as a system to generate both individual and system-wide experiences, even though these experiences may appear to be the independent outcomes of one-to-one, subject-object encounters. Thinking again back to Chesluk's surgical device story, making sense of a surgical procedure through the lens of emergence could have helped demonstrate the importance of all human and non-human actors (not just the surgeon and the client's device) on the outcome of the surgery.

These concepts from systems theory, we believe, can provide a useful corrective to the discursive frame of user-centeredness—if, that is, we can put them into practice in our work.

Advancing New Perspectives and Tools: User Ecosystem Thinking

Our challenge was to find a way to operationalize these key concepts of systems thinking. We could see the value of a systems orientation in industry ethnography and how it could counter the frictions we'd experienced, but we also recognized that we needed a practical framework to put it into action. Looking retrospectively at ways that our own practice had been shaped by friction, we worked to develop a new collection of concepts, activities, and tools to help activate and sustain a stronger systems orientation in our work. Collaborating on and off over the course of a few years, we came up with an experimental approach. It entails a revised, systems-sensitive model of what it means to be a "user," what it means to "use," and a method for surfacing these in our practice. We see this work as far from a cure-all, but rather as a small and hopefully helpful contribution toward a disciplinary reorientation.

We describe this new approach, which we call "user ecosystem thinking," more fully elsewhere (Youngblood, Chesluk, and Haidary, 2020; Chesluk and Youngblood, forthcoming), but here is the foundation:

1. User ecosystem thinking begins with the understanding that anything designed can be part of a myriad of different human experiences and relationships, many of which are systematically excluded from our ethnographic view by enduring frictions that are endemic to ethnography in industry. These experiences and relationships can be direct as well as indirect, intentional as well as unintentional, proximate as well as distant.

2. Building on this insight, we can usefully redefine what it means to be a "user." In our work, we've begun defining users as anyone who has a personal experience, of any sort, with a designed artifact. Defined in this way, a person can be considered a user regardless of the nature of the particular experience that they have with the artifact, whether or not the artifact was intended for them to

experience, and whether or not they are perceived to be a locus of value for industry.

User ecosystem thinking asserts that, while user-centered approaches in design ethnography typically focus on the most visible and direct one-to-one user relationships between subjects and objects, there are multiple other forms of user relationships that are important to understand but usually overlooked. To make this assertion practical, we created a typological framework of "user archetypes" for brainstorming and analyzing the different types of user relationships that might exist around a product or service.

Our toolkit identifies fifteen archetypes. These are not humanized personas but, rather, impersonal embodiments of an archetypical relationship of "use" (as we've redefined it) that draws our attention to often-overlooked roles and experiences. In most cases, they also draw our attention to interconnectedness and synergy with other users (see table 1). One archetype, for example, is the "governing user." As the name suggests, this archetype engages artifacts in ways that significantly control or constrain the experience that some other user, somewhere, is able to have with the artifact. Another archetype is the "serial user," characterized by engagement with an artifact as just one user in a series of other users who also engage the artifact. These serialized relationships draw our attention to the dimension of time, and to the ways in which individual use and experience is shaped by, and in turn shapes, other users' engagements that precede or follow. It's important to note that governing users and serial users are not necessarily aware of the constraints and affordances they place on others (or of those that may have been placed on themselves), because the systemic effects of their own behavior, and the behavior of others, are not always readily visible to them. This applies to the rest of the archetypes as well. One archetype, for instance, is one we call the "oblique user." This user, often far removed in time or space from more direct users, engages artifacts as a downstream by-product of someone else's use. Oblique users might experience these artifacts as something highly visible (and possibly valued)—for example, in the form of discarded goods or scrap materials. But they might also experience them less visibly and less consciously—for example, as toxic pollutants or some other undesirable residue of past use.

We don't insist that any of the archetypes are always exclusively different than what might be more typically considered the "primary user" or "end user" of a specific product or service. We also don't purport that these archetypes are MECE—that is, mutually exclusive and collectively exhaustive. Rather, the archetypes often blur, overlap, or nest. In the real world, people's roles and experiences rarely conform to just one of the archetypes, even in the same moment of engagement. Rather, the idea is that, together, the fifteen archetypes help to build mental models of potentially operative systems of use and systems of experience—in

turn, prompting more robust research, insights, ideation, and understanding of implications.

Table 1. Experimental user archetypes for user ecosystem thinking.

Archetype	Significance for Ecosystemic Ethnography
Direct User	Users who engage artifacts in an active, one-to-one relationship between user and artifact. These users are the typical focus of user research.
Indirect User	Users who engage with artifacts indirectly via other users, inherently highlighting general systemic relationships.
Intermediary User	Users who enable others to engage artifacts by bridging a gap. Both the act of intermediation and the nature of the gap are key to understanding user ecosystems.
Governing User	Users who control the quality or even the actuality of others' experience with artifacts, highlighting some power and political dimensions of the user ecosystem.
Dependent User	Users whose autonomy over experiences with artifacts is compromised or controlled by the behavior and experience of others. The converse of governing users.
Parallel User	Users who engage artifacts along with others who are also engaging the same artifact in more or less the same way. In the process, their behaviors may support or conflict with each other.
Complementary User	Users who engage artifacts along with others but in different ways. In the process, their behaviors may support or conflict with each other.
Serial user	Users who engage artifacts in a sequence of users—calling attention to ways earlier users can impact later ones positively or negatively, and foregrounding the dimension of time in a user ecosystem.
Surrogate user	Users who engage artifacts as a proxy or substitute for other users, possibly helping or harming the users they stand in for.
Terminal user	Users who are the "targets" of another user's engagement with an artifact, spotlighting ways users can be relatively passive "objects" rather than active subjects in an ecosystem.
Ambient user	Users who experience artifacts through the effect on their immediate surroundings, highlighting broadly social but potentially indiscriminate forms of user experiences.
Conglomerate user	Users who engage artifacts consciously but intimately, almost as a part of themselves, highlighting the fuzzy boundary between artifacts and subjectivity.
Autonomic user	Users who engage with artifacts in a way that is automatic, unconscious, and seamless, foregrounding ways artifact-subject boundaries can be erased in practice.

Oblique user	Users who experience artifacts as the downstream by-products of others' use, emphasizing experiences that are often downplayed or ignored due to their distance in space and/or time.
Generative user	Users whose use alters the artifact itself, focusing attention on emergent aspects of engagement in a user ecosystem.

To simplify and facilitate the use of the archetypes by ethnographers and others, we represented these in different ways. One way is in text form, in language that presents their concepts in de-academicized, accessible terms and examples, not requiring the reader to be steeped in the underlying anthropological and design theory that is their foundation. We strove to give each a name that is clearly descriptive (sans excess flair or cleverness) and a motto that summarizes their relationship with artifacts and/or other users. Beyond this text, we worked with our design coauthor Nadeem Haidary to represent the user archetypes graphically and tactilely as a card deck (figure 4).[2] This card deck forms the basis of a set of structured activities for applying the typology at different steps in the research and design process, from scoping initial research and brainstorming, through analyzing the current state, to imagining radically different future possibilities for products and services, their users, and experiences. These structured activities (there are six of them) are described in detail in the toolkit as well as summarized stepwise on additional cards in the deck (figure 5).

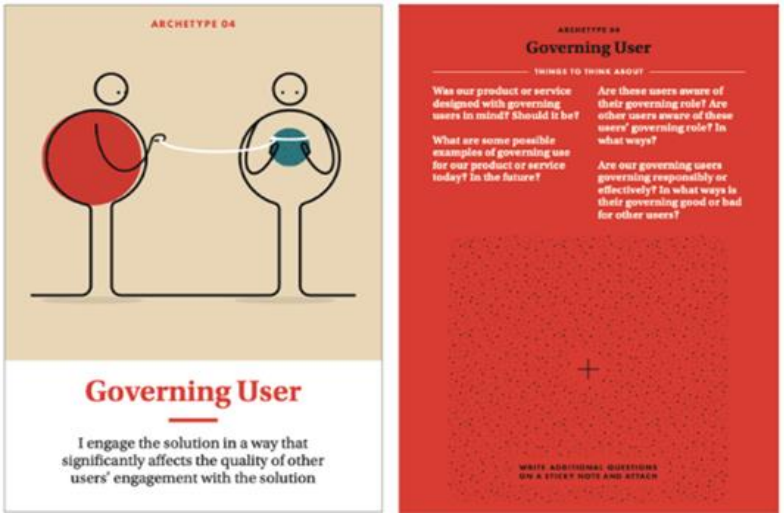

Fig. 4. Each of the User Archetype Cards has a simple visual representation and motto on the face side. The back side has starter questions for brainstorming, and dedicated space for attaching a sticky note for ideas and new questions. Image © Youngblood, Chesluk, and Haidary 2020, used with permission.

Fig. 5. The six exercise cards include step-by-step instructions for working with the archetypes to discover different aspects of a user ecosystem or inform different phases of a project. Image © Youngblood, Chesluk, and Haidary 2020, used with permission.

Since we first began prototyping user ecosystem thinking and sharing it with others, we've heard stories from designers and researchers around the world putting it into use in projects, design classes, and professional workshops, both in person and online. And, of course, we have put it to use in our own practices as well. For example, Chesluk has employed the framework and typology in his work on physician board certification, experimenting with reframing certification as not just a discrete status earned by and applied to an individual physician, but rather the product of an entire network, including physicians' mentors, support staff and even patients, as well as the national network of physicians who create the tests involved in the certification process. Youngblood has recently used the framework and user typology as a thinking tool for his work with a grief support provider for under-served children and teens who have lost a parent. The governing user archetype, for example, prompted questions for research about people in the grief service ecosystem who may knowingly or unknowingly impede or negatively influence a youth's access or experience with support services. While barriers and negative influences would likely have come up in the research without this archetype as a tool, regarding the human actors involved as "users" made it easier to envision designing *for* them rather than against them as part of the solution.

Our goal for user ecosystem thinking is that it should work as a practical approach for pushing back against the pernicious effects of the frictions we've experienced in our work. Against the friction of availability, the typology of user archetypes and structured activities helps individual researchers and teams tune in to more users and contexts by making them more accessible and top of mind. This is

made possible by the typology of archetypes and also by the redefinition of "use" as *any* personal experience with an artifact. Against the friction of dissonant knowledge, the approach gets teams actively engaged in making the case for learning about user groups that have hitherto been un- or underexplored, or even actively excluded. This is enabled, in part, by the archetypes' agnosticism toward industry's intended uses for a product or service, eliminating this key filter on who and what gets attention. And against the friction of entrenched praxis, the structured activities using the card deck help unlock teams out of habitual points of view, approaches to research, and analysis.

In this way, we believe the user ecosystem thinking approach helps further the epistemological, creative, and ethical potentials of ethnography and design.

Fig. 6. Archetype cards in use during a brainstorming activity. Photos courtesy Gabriel de Sousa via LinkedIn, used with permission.

Among the six user ecosystem exercises that we've created and found useful, we can highlight one in particular that can inform the planning and scoping of design research. This exercise, which we call "Current-State Ecosystem," facilitates a process for researchers working on a particular product or service to systematically examine each of the 15 user archetypes and attempt to identify at least one example of a user of each archetype for that product or service in the current ecosystem of users.

One value of this exercise is that it has the effect of broadening everyone's perspective on the types of user relationships and possible experiences that already exist. Another value is that it reveals gray areas where our understanding of people's connections to and experiences with products and services may fall short.

In workshops and project applications, we have consistently seen teams discover new ways of thinking about solutions they may have been working on for years. When it comes to research planning, the Current-State Ecosystem exercise has the additional benefit of explicitly cuing participants to being ready to perceive user types or relationships "in the wild" that would have otherwise been susceptible to being overlooked (as in Youngblood's cell phone research) or edited out (as in Chesluk's

medical device study). In retrospect, we wish our younger professional selves could have had access to similar tools and ideas when planning those and other past projects. They could have helped us avoid the frictional pull of the default assumptions about users that wound up structuring what we could or could not learn from our research efforts. Imagine, for example, if the project team in Chesluk's medical device study had gone through the Current-State Ecosystem exercise before deciding where and how to do fieldwork; their research may have centered users in storage rooms, as well as various staging and cleaning zones in the operating room, in addition to surgeons, and the team could have come to an agreement regarding how to gather, present, and eventually use any information about these other types of users.

CONCLUSION

Where could we go from here?

We believe that a systems orientation can advance the practice of ethnography in industry in fundamental ways. A systems-oriented ethnography can expand how we define our research questions and problems-to-be-solved, especially when supported with tools and activities that make systems thinking broadly accessible and easy to apply. This, in turn, can make us more thoughtful about the design of our research—giving us fresh perspective on how we identify relevant research sites, settings, and subjects to engage, and pushing us toward new areas of inquiry that are often overlooked. Systems-oriented research can also advance how we interpret data. It can push us to develop frameworks for sense-making that properly situate our research in complex systemic context, as well as frameworks for creative visioning of systems-sensitive solutions and communicating their value.

Our endeavor into user ecosystem thinking is just one possible approach to this. We're eager to learn from fellow practitioners working on other approaches, and look forward to more ideas, tools, and methods that could help steer industry ethnography toward more systems-informed ways of doing, and thinking about, our work.

ABOUT THE AUTHORS

Benjamin Chesluk has conducted research to improve the design of health care since 2005, currently at the American Board of Internal Medicine. Ben earned his PhD in cultural anthropology at the University of California–Santa Cruz. He is coauthor of *Rethinking Users: The Design Guide to User Ecosystem Thinking.*

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NOTES

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1. In this paper we use the terms "industry ethnography," "design ethnography," and "design research" to denote applied ethnographic research that is understood to be "user-centered," or "human-centered," in the sense that it seeks to understand specific human behavior and experiences with intent to inform the design of products, services, built environments, policies, and other purposeful artifacts.

2. In this project, we approached visual and tactile design as a language—a nonverbal way to embody and communicate theory and practice, on par with the written word. Both the written and visual/tactile dimensions of the book and toolkit benefitted tremendously from close collaboration throughout the project.

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