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Coding Knowledge

Knowledge is one of those things that just *is*. But even for those of us whose jobs depend on making new knowledge, questioning old knowledge, and moving knowledge around, the concept itself eludes easy definition. The *Oxford English Dictionary* is not much help; in what must be the apogee of mind-bending circular definitions, it defines knowledge as “facts, information, and skills” acquired by experience, but then refers to the “awareness [of] and familiarity [with]” those same facts as knowledge. What this definition does acknowledge is that knowledge is something that spans the subject-object divide—that line that separates “us” from “them” and that operates in ways both visible and invisible. What it doesn’t do is help us think through the consequences of this bifurcated way of thinking.

The sociologist Karl Maton, who studies education, calls this problem *knowledge-blindness*, pointing out that even in those academic fields where knowledge is studied, it is almost always understood as specialized [1]. Those studying knowledge in, say, design, are unlikely to keep tabs on theories of knowledge in medicine. The result is that what we do know about how knowledge works tends to be segmented and confined.

To make it easier to think about the nature and effects of this segmentation, Maton uses a theoretical frame called field theory, developed by the well-known sociologist Pierre Bourdieu. While the nuance of field theory cannot be summed up in a paragraph, a fundamental idea is that fields of practice are arenas where action is patterned in a way that is recognizable

to participants who have access to those fields. Coffee shops have elements of fields of practice where the basic patterns of action include lining up, placing an order, and picking up a cup. But fields of practice always have an element of competition, and in that sense, it can be helpful to think of them as a sports field. New coffee shops, for example, often distinguish themselves from others in the same field by offering different and better coffee or decor. Many of the ways to distinguish different players in a field go unspoken, but as fields develop, it is not uncommon for formal rules to emerge. For example, there is an annual training and competition for coffee baristas where the judging criteria include both the taste of the coffee and how tidy the barista keeps their working area. These spoken or unspoken criteria form the rules of the game for a particular field of practice.

Maton’s remedy to knowledge-blindness is a theoretical toolkit called Legitimation Code Theory, or LCT. Broadly speaking, LCT provides a way to map knowledge as it moves within and between fields, while also mapping knowledge as it changes phase between subject and object. Conceptual devices within LCT describe these movements,

allowing a researcher to more precisely see what is going on within a field as knowledge develops and transmutes.

Of the many concepts so far identified in LCT, one in particular stands out for its elegance, simplicity, and explanatory power, especially as applied to the field of human-computer interaction. This is the concept of *specialization codes*, which considers two dimensions of practice in a field. The first is the relationship between the practice and the individual enacting the practice. Maton calls this organizing principle *social relations*, and it can be weaker or stronger. As a hypothetical example, take assembly-line work. That field of practice has been intentionally designed around relatively weak social relations between the subject (the worker) and the object (the work). In an idealized assembly line, any worker could do any task. As a counter-example, think about the world of elite art. That field of practice revolves around stronger social relations between the subject (the artist) and the object (the art). A perfect replica of the *Mona Lisa* has no value as art, because its value is dependent on social relations. The second dimension of practice is *epistemic relations*, which indexes how a field of practice is oriented to the world. It can be helpful to think of epistemic relations as tending toward either the more abstract or the more concrete. For example, some broad fields of practice, such as philosophy, tend to be more abstract, whereas others, such as automobile repair, tend to be more concrete. Maton represents the relationship between epistemic relations and social relations graphically on a Cartesian plane, shown in Figure 1.

Here is where I had an aha moment, and where I think you might as well. Field theory is useful in identifying and

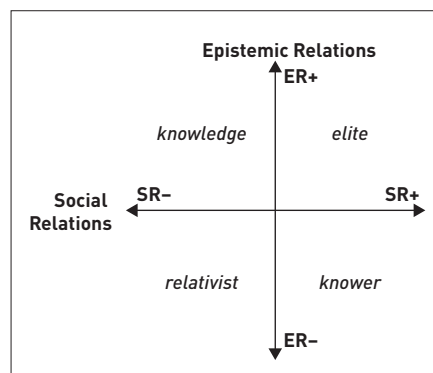
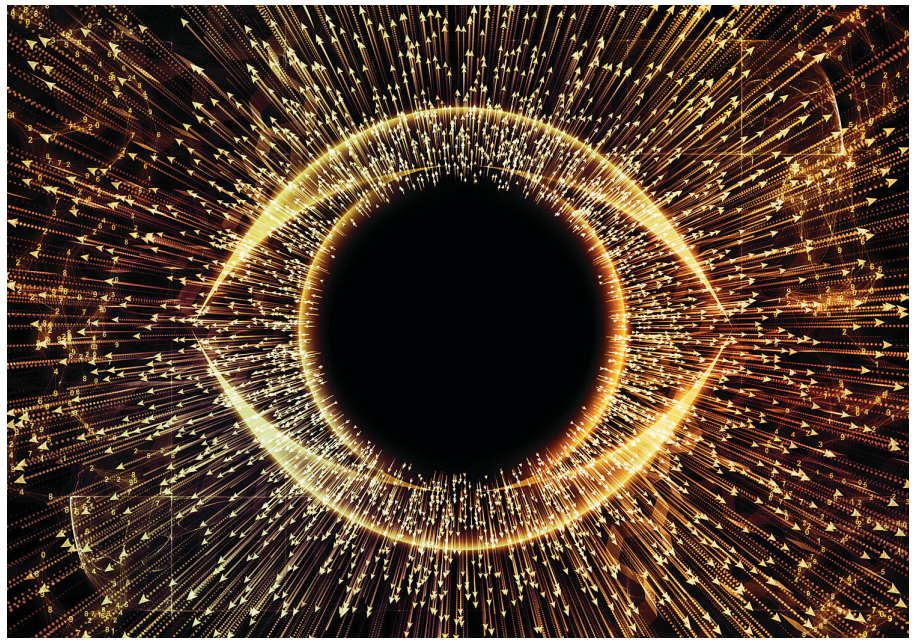


Figure 1. The specialization plane. See Maton [1].

thinking through the operation and boundaries of a domain of practice. In architecture, for example, the sociologist Garry Stevens used field theory to write a devastating analysis that helped make clear the barriers to change in that field [2]. But if the goal is to subtly change or radically transform how a field operates, one bumps up against the limits of field theory. This is where LCT comes in. The concept of specialization codes illuminates how different fields value knowledge and knowing. For example, others using LCT [3] show how architecture is often based on an *elite code*. In architecture, one must be versed in specialized knowledge (stronger epistemic relations or ER+) but also be the right kind of knower, a gifted or creative thinker (stronger social relations or SR+), which explains why architects not only talk about the rhythm of fenestration instead of window patterns but also, like the artist, typically cultivate a particularity of persona expressed, in part, through habitual ways of talking and dressing. In contrast, being considered a legitimate player in the field of engineering is based on a *knowledge code* (ER+, SR−). Learn the lingo and you're one of the crowd. Unlike architecture, no black clothing or severe glasses are required to signal that you are the right kind of knower; the knowledge itself is adequate. In contrast, in fields with *knower codes* (ER−, SR+)—bottom right of Figure 1—being the right kind of knower is paramount. Tastemakers and style gurus fall into this category: Think *Queer Eye*. Finally, fields with *relativist codes* (ER−, SR−) have criteria for legitimacy that include neither knowing specific things nor being the right kind of knower. Imagine a bad five-paragraph essay that relies only on an appeal to the author's personal preferences, rather than engaging with any other form of knowledge. Perhaps in this quadrant, however, there is a voyeuristic dimension of legitimacy that can account for the Kardashians and the Instafamous.

Where does human-computer interaction sit with respect to the elite, knowledge, knower, and relativist codes? I think it is safe to discard the relativist code as a possibility. A study of



interaction design found that it spanned the knowledge and knower codes, speculating that the newness of the discipline meant there was not yet general agreement on the boundaries of the field or the rules of the game [3]. That study was done, however, when interaction design was still in its infancy, so it is likely that the field has hardened around one code or the other. Information visualization, on the other hand, is forged from an elite code. While the principles may seem knowledge based, a taste for Tufte is clearly evidenced in the aesthetic of many InfoViz projects. There is also a progressive social purpose, which goes largely unspoken, behind well-known examples such as the Million Dollar Blocks project.

The concept of specialization codes can help surface a key tension in the products and processes of human-computer interaction. This tension is manifest when the often-unspoken dominant approach to knowledge—the knower code—clashes with the ends to which we put technology. In debates about the integrity of elections or the fate of taxi drivers, Facebook, Uber, and many other “transformative” platforms fall back on the knower code as a way to defend business as usual: The claim is that the platform or technology is simply providing knowledge to be analyzed and used by a rational

consumer. This may make sense in those domains of life that are dominated by a knowledge code. If I am buying a new washing machine, I appreciate an accurate comparison of my options. But in other domains—and for other people—a knower code is more relevant. Many, for example, look not to substantive facts and ratings, but first to the opinions of others, to inform their decisions on everything from which washing machine to purchase to which politician to support. Designing without consideration for the specialization code, or codes, in operation can blind designers of technology to the effects of the work that technology does.

ENDNOTES

1. Maton, K. *Knowledge and Knowers: Towards a Realist Sociology of Education*. Routledge, London, 2014.
2. Stevens, G. *The Favored Circle: The Social Foundations of Architectural Distinction*. MIT Press, 1998.
3. Carvalho, L., Dong, A., and Maton, K. Legitimizing design: A sociology of knowledge account of the field. *Design Studies* 30, 5 (Sept. 2009), 483–502; <https://doi.org/10.1016/j.destud.2008.11.005>

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