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Boundary Obects and Beyond. Working with Leigh Star, Cambridge, MA, MIT Press, 2016, pp. 560

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This book is the result of a conference that fellows, students and co-authors dedicated to the beloved scholar, Leigh Star, to celebrate her inspirational work. The book's editors avoided the favourable tone that is typical – and to some extent, involuntary – in such works, by putting together a balanced selection of essays *by* Star and *on* Star, which flows seamlessly and ultimately provides a rich and precise portrait of the scholar. The book ultimately covers not only her intellectual contributions to scientific knowledge, but also her mindful self-reflection on the role of researchers in society as part of an epistemological discourse. Altogether, the book provides a thick web of reflections displaying the potential of Star's intellectual contribution and suggesting possible directions in which to extend her work.

In fact, one major trait that characterises Star's legacy relates to her influential contributions across a wide spectrum of scientific domains. This is exemplified by her most cited publication, where Star and James R.

Griesemer introduced the concept of "boundary object" (addressed in Ch. 7). It is worth to get back to Star and Griesemer's definition. For them, a "boundary object" is an object that is "both plastic enough to adapt to local needs and constraints of the several parties employing [it], yet robust enough to maintain a common identity across sites". Therefore, a "boundary object" is "weakly structured in common use, and become strongly structured in individual-site use" (pp. 176-177). Because of these features a "boundary object" can have a different meaning in different social worlds, but its structure is common enough to make it recognisable, so that it can work as a means of translation.

It is worth noting that citations of Star and Griesemer's article appear in publications across more than 90 research areas. The top three areas in terms of the number of citations, based on the Web of Science classification, are Business Economics, Computer Science, History and Philosophy of Science; Sociology comes in at the sixth place. Such an influential presence across various distinct fields not only qualifies the relevance of Star's scientific contribution, but also suggests that her theorisation is a boundary object in itself, being plastic enough to be adopted as a tool for research investigations by various scientific communities, while preserving its own identity.

Dick Boland (Ch. 10) effectively explains why and how the concept of boundary objects was so influential in management and organisation studies. The concept demarcates concrete and situated things that actors with heterogeneous knowledge can use and refer to, while cooperating and working together, without setting or agreeing on the nature of the objects, actions or goals to be achieved. Further, this concept brings in a perspective that is entirely different from what was previous offered by semiotics, where symbols may be ascribed different meanings by different people but the spectrum of those meanings is constrained within a space of mutual understanding (i.e., individual expectations on everyone's meanings).

In a similar vein, Griesemer (Ch. 8) reflects on the ideas discussed by Star and himself at the time they were elaborating on the concept of boundary objects, from the perspective of Science and Technology Studies (STS). They wanted to develop a "heuristic methodological category to think with as much as an ontological category of object to think about" (p. 207). Thus, the concept of boundary objects has both epistemological and ontological consequences. In the former case, it provides STS with a methodological tool that increases standardisation across studies and, therefore, scientific rigor. As for the latter, the concept embodies the complexity of relationships among agents at multiple levels (e.g. meanings, action, goals) of interaction.

As anticipated, the concept of boundary objects became extremely popular in various fields, causing its core meaning to be undermined. Star (2010), in turn, was compelled to explain and elaborate on what a

boundary object is not. On the one hand, she expanded the concept by clarifying that boundary objects are not restricted to the four types mentioned in her 1989 work, namely, repositories, ideal types, coincident boundaries and standardised forms. On the other, she called for a deeper analysis of boundary objects to incorporate their organisational structure, as well as their intrinsic processual dimension, as connectors of cooperative work. The emphasis on the organisational structure of boundary objects led Star to reflect on systems constituting boundary objects that she identifies as infrastructures, a conceptualisation that also occupies a special place in Star's theorisations as well as in her epistemology. The centrality of this concept and its ramifications can also be observed in the writings selected for this book as the idea of infrastructure is relevant in a number of essays (i.e. Chs. 2, 7, 20, 21, 23, 24); this includes the seminal paper written with Karen Ruhleder (Ch. 20) on the design, development and use of WCS – the Worm Community System – which is a data repository as well as a platform to support the formal and informal communication of a distributed community of biologists, who are active in more than 100 different laboratories around the world. Through this study, Star and Ruhleder outlined their theory of infrastructure. Infrastructures are scaled-up systems of boundary objects, inheriting from the latter their relational and ecological nature: they "mean different things to different people" and are "part of the balance of action, tools and the built environment, inseparable from them" (p. 473). Infrastructures both anchor and are anchored to organised, context-dependent practices. Star characterises infrastructures in detail as embedded and transparent, but visible upon breakdown (i.e. infrastructural inversion); as able to support tasks and practices; as able to afford membership in a community of practice, which evolves in a mutual adjustment with infrastructures.

Star leverages the concept of infrastructure to develop some critical insights on the realm of the philosophy of science. In her view, science is conceived as a socially constructed ecology of knowledge (Ch. 1). Consistent with the STS approach, Star's analyses of science and technology includes the process – and not only the product – of the production of scientific knowledge to unveil what is otherwise taken for granted as scientific infrastructure.

"As chains of causation are simplified and purified, the standard indicators they are built on become substitute theories. We forfeit the infrastructural conditions that afford us the possibility of formulating alternative explanations" (p. 432). When the understanding of a phenomenon essentially relies on dominant chains of causal relationships, supported by infrastructures such as standard indicators and tools, this understanding expunges, as residual evidence, anomalies that would provide the grounds for richer insights into that phenomenon.

Furthermore, Star enhances her reasoning on infrastructures by offering thorough reflections on the methodological challenges posed by this

concept (Ch. 24). The study on WCS is the result of fieldwork spanning three years; despite a strict adherence to the principles of participatory design, the new system was disregarded by most biologists. This disappointing result led the research team to deepen their analysis of the situation and, ultimately, to better understand how critical and intensive the relational nature of infrastructure was.

This book can claim many merits. The selection of essays offers an excellent resource for scholars interested in understanding and tracing the origins of very influential concepts (i.e. boundary objects and infrastructures), the research questions that sparked them and how particular empirical settings influenced their formulation. This book will also be useful for researchers, such as PhD students, who are deliberating on the methodological aspects of their work. In fact, although the book is certainly not meant to be a handbook on methodology, it offers rich and rigorous reflections on fundamental methodological themes from the first-person perspective and deeply reflects the common emotional and cognitive identity of researchers.

On this point, a representative example is offered by the notion of "triangulation from the margins", as described by John King (Ch. 17). Triangulation is certainly a widespread practice in the social sciences to improve the understanding of complex phenomena. Star questioned the idea that this understanding could be achieved by primarily triangulating the narrative of those who have the most to gain or lose. In contrast, Star theorised the importance of triangulating using the narratives of those who exist in the margins: these individuals can observe elements, which are totally neglected by the dominant views, and therefore, they contribute to the enrichment of the triangulation through insights that would otherwise be lost.

As Leigh Star writes, "as a graduate student, I searched for years for teachers who would not try to divorce me from my life experience, feelings, and feminist commitments. At the same time, I didn't want just a 'touchy-feelings' sort of graduate education. […] I was looking for a way simultaneously to incorporate formal and informal understanding" (p. 122). For those who recognise themselves in such yearning, this book will certainly offer an opportunity to reflect on their own path.

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