

Introduction: Alignment Work for the Movement of Knowledge

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Knowledge moves through society in a number of ways: Students are taught scientific “facts” in class, health care practitioners explain diagnoses and treatments to patients, experts of different backgrounds collaborate, popular media bases stories on medical or forensic procedures – and viewers form their understandings of these procedures (at least in part) from these stories.¹ In other words, knowledge produced in one context moves – or, rather, is moved – to a succession of other contexts; not necessarily the contexts that were envisioned by the original producers of the knowledge. In addition, knowledge may change as it moves, perhaps to the point of being difficult to recognize.

The point of departure for this special issue is that the movement of knowledge, more so the *stable* movement of knowledge, is work that deserves detailed and systematic analytical attention. Knowledge in different forms and shapes is a – if not the – central concern in STS. The everyday work of producing knowledge has received in-depth attention from the beginning (e.g., Latour and Woolgar, 1979; Lynch, 1985; Knorr Cetina, 1981, 1999). The movement of

knowledge has also been studied for a long time, albeit under different names – for example as the *exchange* (e.g. Galison, 1997), the *transmission* (e.g. Lambooy, 2004), the *circulation* (e.g., Raj, 2007; Östling et al., 2018), the *dissemination* or *travel* (Howlett and Morgan, 2011) of knowledge. However, while this body of work has mapped the routes of how knowledge is moved across different kinds of communities in interesting ways, the everyday work of moving knowledge has not received as much explicit attention as that of its production. That is, while the movement of knowledge is a central concern in STS, this concern has rarely been studied at the same micro level as has the production of knowledge, leading also to fewer theoretical notions that focus explicitly on the everyday work of moving knowledge. A notable and well-known exception is ANT where, however, the production and movement of knowledge sometimes are indistinguishable (e.g. Latour, 1983, 1987).

Implicitly, the movement of knowledge figures in several STS notions. Galison’s trading zones (1997), for example, draw parallels between the exchange of knowledge across scientific (sub-)



disciplines and the trade of goods between different and not necessarily friendly ethnic groups – he even speaks of trading with “the enemy” (Galison, 2010). While his focus is on how these metaphorical trading zones facilitate the moment of exchange, the exchange also implies knowledge moving to a new site to be used there. Similarly, the collaboration of very different social worlds that Star and Griesemer’s (1989) boundary object makes possible entails at least some knowledge being moved, even though, like the knowledge exchanged in Galison’s trading zones, this knowledge may mean rather different things to the inhabitants of the different worlds.

From an STS adjacent perspective, the contributions to Howlett and Morgan’s (2011) edited volume discuss how (well) facts travel from one place to another, in particular how they can “travel with integrity” (Morgan, 2011: 12) and “fruitfully” (Morgan, 2011: 18), that is, travel unchanged and be used – as opposed to only noted – in their new context. In other fields than STS – predominantly in management and organization studies – scholars grapple with similar questions from a practical point of view, asking for example which factors and processes affect how knowledge can be moved from one department in a company to another, in particular knowledge in the form of innovation; their work often is quantitative (e.g., Szulanski, 2000). A notion particular to this strand of research is the ‘stickiness’ of knowledge – a term that refers to the cost of its replication and transfer (e.g., von Hippel, 1994) – that must be overcome or at least mitigated for knowledge to be moved (see also Szulanski, 1996). In other words, this scholarship acknowledges and strives to understand the difficulties of moving knowledge between collaborating communities.

An implicit aspect of this movement is that quite some collaborations – the criminal justice system that Kruse (e.g., 2016, 2021) has studied is an example – require that knowledge moved between collaborators remains at least somewhat stable during the move. In the comparatively extreme case of the criminal justice system, forensic evidence must be (understood as) unchanged from the trace the crime scene technicians recovered at the crime scene, through the analysis at the forensic laboratory, its inte-

gration into the pre-trial investigation, and its presentation in court. But also in less demanding contexts, a measure of stability is desirable. When for example medical experts, like the midwives in Gleisner’s contribution in this volume, give advice to patients, they want them to understand and follow this advice without misunderstandings or modifications.

What makes such stability, be it rigid or more flexible, more difficult are the different understandings of the “same” knowledge in the different communities. To take an example from Grankvist’s contribution, to an occupational health services provider, adjustable desks are the best solution to office workers’ lower back pain, whereas they can be an impossible or undesirable expense to an employer. Similarly, to a forensic scientist a probabilistic evaluation of a DNA match is a careful of inescapable uncertainty, while a prosecutor may either not perceive any uncertainty at all or wonder what makes the evidence so “weak” (Kruse, 2013). In other words, what may look, on the surface, like the same thing – a solution to an occupational health problem or an expert statement – can mean quite different things to different sets of people – due to different expertise, backgrounds, and priorities.

Karin Knorr Cetina (1999) has discussed such different meanings in terms of different ‘epistemic cultures,’ that is, different cultures of producing and, in consequence, understanding knowledge. Her notion is based on two scientific disciplines – molecular biology and experimental high energy physics – and focuses on their very different “machineries of knowledge construction” (Knorr Cetina, 1999: 3), without an interest for how they might interact or exchange knowledge.

However, her notion can be usefully widened into a broader understanding that draws attention to how disparately different communities relate to and understand knowledge. Kruse (2016) has earlier discussed the Swedish criminal justice system as a collaboration of different epistemic cultures with different ways of contributing to and understanding the production of forensic evidence; but one can easily also conceptualize the meeting between a midwife and a pregnant person as a meeting of different epistemic cultures – the midwife’s medical way of understanding

and relating to a pregnancy and the pregnant person's rather personal relation, embodied and embedded in personal history, relationships, emotions, and practicalities.

Thus, with this special issue, we build on and develop existing STS awareness of and sensibility for epistemic differences and the work required for bridging them. Specifically, we want to add to the study of knowledge a sensibility for the work associated with aligning the different understandings that can make its movement challenging. Different understandings in different epistemic cultures can make the movement of knowledge between them difficult – this becomes particularly visible in current debates on the relevance and intelligibility of expertise (e.g., Åkerman et al., 2020). We build on the notion of *alignment work* (Kruse, 2021) to draw systematic analytical attention to the continuous work that, we argue, is an integral part of resolving tensions (cf. Star and Ruhleder, 1996) between different communities and thus a prerequisite for moving knowledge between them.

Alignment Work

A central point in this special issue is that the movement of knowledge and in particular the stable movement of knowledge between different epistemic cultures requires the alignment of different communities, actants, and knowledges, at least temporarily. The pivotal notion of 'alignment work' (Kruse, 2021) is inspired by both the 'articulation work' described by Anselm Strauss (Strauss et al., 1985: chapter 7; Star, 1991: 275), and Janet Vertesi's (2014) work on 'alignment' and 'seamlessness.' Articulation work as a concept draws attention to the often invisible work that makes the work perceived as the core work possible. Even though articulation work is essential for the work of others, it is thus not necessarily seen or acknowledged by these others, especially as long as it is performed as expected (Star, 1991: 275 ff).

Vertesi (2014) on the other hand draws attention to the gaps or 'seams' between infrastructures with different standards – seams that are akin to the 'tension' between different sites that infrastructure studies discuss. As Star and Ruhleder put it, infrastructures resolve "the

tension between local and global" (1996: 114; italics in original) that makes the movement of people, goods, and knowledge difficult. In order to function, an infrastructure must resolve these tensions – and if it does, its users do not notice that there was tension. To return to Vertesi, tensions are resolved or seams bridged by actors' producing "a shared experience of seamlessness" (Vertesi, 2014: 277) through "moments of alignment between and across systems" (Vertesi, 2014: 268) in environments that rely on multiple, overlapping infrastructures. Even though she does not elaborate on its production, her work underlines that seamlessness is a fleeting state that must be repeatedly produced.

This repeated production, then, can be called alignment work – a form of articulation work that (at times, temporarily) aligns different epistemic cultures to attain an experience of seamlessness in the movement of knowledge (Kruse, 2021). Thinking in terms of alignment work makes it possible to capture the continuous work that enables knowledge to be moved from one site or epistemic culture to another; what is more, to be moved with integrity and fruitfully (cf. Morgan, 2011) despite the tension caused by epistemic differences such as potentially different understandings of the "same" knowledge.

The concept of alignment work ties into and develops themes that other STS scholars have hinted at or discussed in different terms and with different foci and analytic concerns. Galison, for example, speaks about the "coordination" (Galison, 2010: 32) of trade in his trading zones, i.e., trading partners agreeing on which goods to exchange. Star and Griesemer talk about boundary objects as "anchors or bridges" (1989: 414) that (temporarily) tie different worlds together in collaboration. ANT, finally, speaks of making dissent costly (Latour, 1990: 41 f) and of convincing others of one's perspective (Callon, 1986; Latour, 1987) – in other words, of creating homogenous understandings. Conversely, Gröndal and Holmberg (2021) use the term alignment work, albeit in a different way to Kruse, to draw attention to discursive strategies that "harmonize different demands, interest and risks" (Gröndal and Holmberg, 2021: 5). Like the concept at the core of this issue, their notion draws attention to the constant work that

coherence requires. Unlike the alignment work in this issue, their alignment work is discursive work; in addition, it is work that is largely done within a profession (and thus presumably within an epistemic culture) to reconcile conflicting values.

By centering a special issue on alignment work, then, we want to bring detailed attention to the continuous, everyday work of – perhaps fleetingly – aligning different understandings so that knowledge can move smoothly across the seams between them. We argue that paying attention to the everyday work of moving knowledge and to the relationships with which this movement is intertwined is as important to STS understandings of knowledge as is paying attention to the work of producing knowledge and to the relationships with which it is intertwined. Alignment work, we posit, is a core part of this everyday work of making knowledge move.

Based on empirical material from different contexts, the articles in this issue develop different aspects of alignment work. They ask when and by whom alignment work is being performed, to whom it is visible or invisible, what seams it smooths over or makes visible and for whom, and which relations are created and maintained.

The Contributions

The contributions in this special issue illuminate the work of alignment in a variety of contexts and practices – literature and early childhood education, midwifery, the criminal justice system, and occupational health services. What these different contexts and practices have in common is that knowledge in some form is expected to move across a seam formed by epistemic differences, facilitated by alignment work. The contributions also all focus on relationships in some way; relationships between humans and non-humans, health care provider and patient, service provider and customer, or within a profession.

Emilie Moberg's contribution discusses potential asymmetries in alignment work and the relationships it implies. Alignment work, she points out, is not immune to power, politics, and privilege. When humans produce and move knowledge about non-humans, they do so from a human-centered position and thus privilege

human understandings: aligning human-centered and non-human-centered worlds to produce knowledge requires empathy, Moberg argues, and this empathy is typically achieved by ascribing human traits to non-humans. However, this alignment at the same time opens up for destabilizing this same anthropocentrism, for example by highlighting the interconnectedness of ecosystems. In other words, she underlines how alignment work both rests on existing power relationships and has the potential to destabilize them; alignment work, so to speak, affects the ecological balance between epistemic cultures.

Jenny Gleisner's article points to a different affective dimension of alignment work. To bridge the tension between sites – in her case, between the midwives' medical expertise and the expectations of parents-to-be – it is not enough to stabilize knowledge as it is being moved, its intended recipients must also want to receive it. Accordingly, emotion work and will work are an integral part in aligning pregnant persons and parents-to-be with the standardized antenatal care program of check-ups and parental education that the health care system offers. Thus, the willingness of parents-to-be to participate in antenatal care and parental education – cultivated by the midwives' emotion work – smooths the seam between the two.

Hannah Grankvist's contribution shows that alignment work is contingent on relationships. Where Gleisner's study took place in sites with firmly established relationships – relationships between health care providers and patients are regulated and institutionalized – occupational health services providers must establish relationships with potential customers before knowledge can be moved. Conversely, when the relationship has progressed to the movement of knowledge, this movement is intertwined with and shaped by maintaining and, ideally, developing an asymmetric relationship. In other words, in order to align different epistemic cultures, occupational health services providers must align different *interests*. Thus, Grankvist's contribution underlines that when alignment work cannot rely on already defined relationships, establishing them is part of and intertwined with alignment work.

Corinna Kruse's paper shows that alignment work does not only affect the intended recipients of knowledge but also those performing the alignment work. She shows how alignment work, while not necessarily visible to or appreciated by others, can be a source of professional pride and identity. That is, the ability to perform alignment work and thus to salvage a possibility for forensic evidence is part of crime scene technicians' self-understanding, thus forming a different affective dimension than the emotion work and relational work discussed by Gleisner and Grankvist, respectively.

Finally, the concluding piece by Corinna Kruse and Antti Silvast highlights how the notion of alignment work complements Karin Knorr Cetina's STS classic *Epistemic Cultures* (1999). Pairing Knorr Cetina's attention to epistemic differences with attention to how the seams caused by these differences can be bridged, they argue, offers a theoretical tool set to think about collaborations between different experts or professions, especially where it is important that knowledge moves without (too much) change.

Together, these contributions paint a diverse picture of alignment work in different locations and contexts. By tracing and discussing these different incarnations of alignment work, this special issue aims to show that alignment work makes moving knowledge over seams possible; paying systematic analytical attention to the continuous work of aligning communities, knowledges, and standards has potential for new insights into issues at the core of STS.

This alignment work might of course look quite different in other cultural contexts and other parts of the world – all of the empirical contributions build on cases from Sweden, most of them, moreover, on cases from or near Sweden's public sector (the exception being occupational health services). Thus, the different instances of alignment work are performed against a backdrop of similar understandings. This similar context might mean that the discussions of alignment work in the empirical contributions might downplay the variability of such work.

Still, the contributions contribute new and different dimensions to the concept of alignment work. For one, they underline the role that rela-

tionships, emotions, and identities play in the movement of knowledge. Alignment work can be intertwined with professional pride and identities; as such it can be a core part of a profession's work or be the prerequisite for being able to do this work. Alignment work is shaped by and maintains existing power relationships and privileges – both in terms of who does the work and to whom it is visible and in terms of the alignment itself – but it can also contribute to questioning the status quo.

These affective dimensions are not encompassed in Kruse's (2021) original notion; she developed the notion based on empirical work in the Swedish criminal justice system. More precisely, she focused on professional practitioners moving knowledge between them – a movement that does not involve emotions² and that relies on comparatively equal institutional and institutionalized relationships. In such a setting, there is not the same need for the appeal to empathy that is part of the alignment work studied by Moberg, the will work described by Gleisner, or the careful aligning of interests discussed by Grankvist in this issue. In other words, applying the notion to new empirical fields has also made it possible to widen its scope and add further dimensions to what alignment work can look like and how it may fit into larger relationships and communities.

Another contribution to the notion is how alignment work shapes the knowledge that is being moved. As Moberg's study highlights, how well educators manage to align the human and the non-human affects the production and movement of knowledge; the same applies to the crime scene technicians, midwives, occupational health services providers in the other articles in this issue. Conversely, unsuccessful alignment work means the movement of less or less nuanced knowledge: The alignment work occupational health practitioners perform directly affects which knowledge they (attempt to) move, and a pregnant person that the midwives do not manage to align with the standard antenatal care program will miss out on the knowledge offered within the program.

In other words, alignment work – which is in turn shaped by the relationships and structures it is embedded in – contributes significantly to shaping not only the movement of knowledge

but also knowledge itself and thus our understanding of the world. Tracing alignment work and the forms it takes in more contexts should make it possible to add more dimensions to that shaping and thus to understanding knowledge – a central STS concern that, moreover, fits in with and complements classic STS notions very well. With this special issue, we would therefore like to invite the STS community to join a conversation on the everyday work of facilitating the movement of knowledge across the seams between epistemic cultures as a part of the conversation on knowledge in society.

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Notes

- 1 An example are offenders' understandings of DNA technologies being shaped by, among other things, popular television crime shows (Prainsack and Kitzberger, 2009; Machado and Prainsack, 2016).
- 2 For a discussion of the work of creating (the appearance of) rationality and emotionlessness in other parts of the criminal justice system, see Bergman Blix and Wettergren (2016).