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Integration and Reflection Essay

The crux of Science and Technology (STS) scholar Sheila Jasanoff’s (1996) argument is that social constructivism can help science and its practitioners. This would require reducing the disconnect between the fields of STS and science, which was especially large in the late 1990s when this article was published. Importantly, this animosity was in large part driven by disagreements over the validity of social constructivism as a way of understanding science (Jasanoff, 1996). In order to understand the gap that Jasanoff (1996) is trying to bridge, we must first establish what social constructivism actually is and why it’s so controversial. Jasanoff (1996) describes social constructivism as a collection of ideas and attitudes rather than a specifically defined process. These ideas tend to hold that the way we categorize and organize the world is socially produced and maintained (Jasanoff, 1996). Additionally, by acknowledging and examining the social construction of science we can gain a better understanding of the way science functions, as well as how science relates to the broader societal context it exists within (Jasanoff, 1996).

However, this is not how everyone views science. Many scientists don’t see science as a social construct, nor do the politicians and bureaucrats who turn to science (and thus scientists) when faced with policy dilemmas. Under the traditional linear model, science should be independent from a social context because the universal laws basic research seeks to understand through standardized methods are themselves unaffected by society (Collingridge & Reeve, 1986; Pielke, 2007; Porter, 1995). Under the linear model, basic research can provide a resource for applied research which can then dictate policy, but researchers don’t – and more importantly shouldn’t – care about potential implications when conducting basic research (Pielke, 2007). The pursuit of knowledge is justification enough under the linear model. In fact, it has to be the only justification for basic research because the bias introduced by any other justification or reason for doing research would tarnish the scientific process and the knowledge it produces (Pielke, 2007). At least, that’s how the linear model sees it.

 Although Collingridge and Reeve (1986) note that the field of science and technology studies has moved on from the simplified linear model, Jasanoff (1996) argues that scientists have yet to come to the same conclusion. This has led to a disconnect between scientists and those who study them (Jasanoff, 1996). While scientists may agree that non-scientific concepts like the nation state are social constructs, their acceptance of constructivism in regards to science is typically limited to the minor admission that research tends to happen where the funding is (Jasanoff, 1996). Although this is a minor violation of the linear model in that it acknowledges even basic research is to some degree dictated by society and its policies, it leaves the broader structure intact (Jasanoff, 1996; Pielke, 2007). However, this admission also raises further questions. Is the effect of society on science really limited to funding? How does the relationship between society and science function? How strong is the effect?

 To Jasanoff (1996), the interdisciplinary disconnect between STS scholars and scientists is harmful because a constructivist approach can provide a useful framework to explain and improve how science functions. By viewing science as the product of social interaction, social constructivists can understand how unofficial means such as the transmission of tacit (unwritten) knowledge can be vital to the continued functioning of science (Jasanoff, 1996). This includes the “rhetorical and cultural devices” used within the scientific community to create and maintain the distinctions between different roles (Jasanoff, 1996, p. 6). One example of this is the way that principal investigators (PIs) are distinct from the staff and student research assistants who support and perform much of the PI’s research. This is also visible in the status distinctions between student teaching assistants, adjuncts, and tenured professors. Constructivism also identifies distinct lab cultures based on the physical and social infrastructure that supports their research, which I think can also help explain the direction and shape of research, in addition to differences between its practitioners (Jasanoff, 1996).

One reason that Jasanoff (1996) gives for the disconnect between scientists and the field of STS is relativism. In fact, when most people think of social constructivism, they’re likely picturing relativism. In the context of science, relativism suggests that scientific claims are “contingent on the local circumstances” that surrounded their production (Jasanoff, 1996, p. 269). However, relativism is often misconstrued as holding that if all science is subjective, then the knowledge it produces is all just a homogenous “mush” (Jasanoff, 1996, p. 269). What relativism can do is provide a way of understanding why some science is ‘settled’ easily while other science is much more messy (Jasanoff, 1996). For example, distinguishing between different degrees of truth and certainty can help explain why some scientific claims are more readily and widely accepted than others (Jasanoff, 1996). Additionally, it is important to note that while relativism is a part of social constructivist thought, social constructivism is broader than just relativism. Relativism is a tool that can be used within a social constructivist framework, but not all social constructivism is relativism.

In a policy context, this reminds me of the under-critical (science only matters when we already agreed on policy) and over-critical (if a policy decision is contested, the relevant science will never be conclusive) models of science described by Collingridge and Reeve (1986) as well as Roger Pielke’s (2007) metaphor of tornado versus abortion politics. Jasanoff (1996) comes to a similar conclusion through her framing lens, where disagreements over the right answer or policy decision reflect deeper disagreements about what the question or issue even is. This is exacerbated by the fact that policymakers tend to ask scientists questions that cannot be answered by science, a phenomenon Sarewitz (2016) and Jasanoff (1996) (both citing physicist Alan Weinberg) call trans-science. Similarly, Pielke (2007) argues this situation can force scientists into the role of stealth issue advocates where personal policy preferences are portrayed as scientific fact. As a result, people become convinced that they have the right (scientifically supported) answer. Therefore, the other side of the issue must be anti-science because they disagree with you. There are multiple names for this phenomenon. Daniel Engber (2017) describes it as an excess of objectivity, while it also falls under Collingridge and Reeve’s (1986) over-critical model. Jasanoff (1996) suggests reframing questions in order to get the most out of science to combat these issues, in addition to understanding scientific facts as socially triangulated (multiple perspectives converging on a collectively endorsed endpoint) rather than a single objective and final outcome.

Where Jasanoff (1996) focuses on the theoretical framework of social constructivism, Nowotny (2003) specifically focuses on the role of the expert in fulfilling the public’s desire for external certainty. Experts are expected to understand Science (the source of external certainty) and then relay it to the general public (Nowotny, 2003). Nowotny uses the role of aristocrats in ancient Greek society as an example of early experts, though I think this also applies to the role that the Catholic Church played in European society prior to the enlightenment and reformation (both of which significantly reduced the church’s power). However, expertise is inherently transgressive in part because it must address issues that aren’t purely scientific and/or technical in nature (Nowotny, 2003). Additionally, Nowotny (2003) argues that experts are responding to others’ questions whereas they respond to their own questions when conducting research. Although Nowotny (2003) doesn’t explicitly acknowledge that research directions are (at least partially) a result of the surrounding society’s values and priorities, I believe this doesn’t actually contradict her argument. This is because society’s influence is certainly felt more strongly (it is both more powerful and overt) when serving as an expert.

Because expertise is transgressive it is also vulnerable to contestation, especially because it forces experts to work beyond their areas of competence (Nowotny, 2003). The limitations of individual experts is one reason they are often gathered into advisory committees, although this can’t fully safeguard them or their conclusions from being disputed (Nowotny, 2003). Regulatory decisions are especially vulnerable to contestation, as experts must try to find scientific consensus to solve normative problems (trans-science) (Jasanoff, 1996; Nowotny, 2003) The pitfalls of trans-science (and the associated contestation) can be seen in the struggles to enact regulation around lead paint and pesticides, as well as countless other issues (Aviv, 2014) One way that experts can protect against contestation is by cultivating legitimacy within their target audience, as trust is a key part of experts persuading people that the claims they make are reliable (Jasanoff, 1996; Nowotny, 2003). Recent efforts to hold expertise democratically accountable (Nowotny refers to this as democratizing expertise) can take multiple forms and generate new tensions. Expanding the definition of expert to include more perspectives and experiences can be a source of democratization, but also risks being standardized and depersonalized to the point that it is no longer viewed as robust by the broader society (Nowotny, 2003).

 Instead of democratizing expertise, Nowotny (2003) argues that the best way to cultivate legitimacy with the broader public is to move towards knowledge that is socially robust rather than knowledge that is only deemed reliable within the scientific community. Socially robust knowledge would still be tested for validity, but this testing should take place both inside and outside the laboratory (Nowotny, 2003). Socially robust knowledge should also be developed through collaboration between experts, users, and laypeople since it must be valid to all three groups (Nowotny, 2003). Therefore, the role of expertise should also be socially distributed. Jasanoff (1996) comes to a similar conclusion, describing the goal of science as creating “ever wider communities of trust” in order to establish truth (p. 270). To both Nowotny (2003) and Jasanoff (1996), society should be an active participant in the production and dissemination of scientific knowledge. This is in contrast to the current paradigm of reliable knowledge, where the public is simply expected to believe what experts say is true (Jasanoff, 1996; Nowotny, 2003). Importantly, socially robust knowledge is produced by a contextual process that varies depending on the levels and setting, as opposed to the rigid and institutionalized process associated with democratized expertise (Nowotny, 2003).

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