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What the Knowledge in Knowledge Infrastructures Does

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I will answer the three questions about Knowledge Infrastructures out of order.

1) What are the most urgent research questions to address about KI? Why?
2) Identify a KI whose survival is under threat.
3) How do KI spread information? Misinformation? Alone and in combination with other infrastructures?

Question 1 and 3: I take these questions to address what Weber called the demands of the day. At this moment, the demand is to understand what knowledge does, its poetics and politics, when it circulates beyond the original context of its creation and intended use. As open science and open data policies gain more traction and carry ramifying sanctions, we can expect more scientific knowledge to circulate beyond the boundaries of science to unexpected effect.

Latent in Edwards' definition of knowledge infrastructure - "robust networks of people, artifacts, and institutions that generate, share, and maintain specific knowledge about the human and natural worlds. (Edwards 2010)" - is a version of the transmission metaphor (Day 2000). In deconstructing the use of the transmission metaphor in information studies, Day argues that the frame delineated by the transmission metaphor elides from our conceptual view the poetic function and political stakes of information. In short, Day argues that information, as it circulates, is generative of meaning and action. In infrastructure terms, the transmission metaphor elides what Larkin has termed the "politics and poetics of infrastructure (Larkin 2013)." For Day and Larkin, infrastructure and, by extension, the knowledge an infrastructure circulates actively make and proliferate meaning and action in the world. Knowledge circulates, but as it encounters new audiences, it generates new meanings, new actions, and often, new forms of sociality. Much like the making of knowledge, circulating knowledge is an unruly business.

Writing recently on misinformation, fake news, and truth, Shapin (2019) argues that well-established scientific knowledge about the safety of vaccines, the rate of climate change, and role of evolution becomes contentious outside of scientific contexts when it impinges on social forms and norms that are essential to the economic livelihood, or social mobility and status of those negatively affected by the knowledge.[1] Increasing the circulation of settled scientific facts, i.e. increasing scientific literacy, he argues, is unlikely to change the situation.

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[1] On the other hand, Shapin notes that knowledge of the laws of thermodynamics is widely accepted and not at all contentious. Nobody, Shapin reasons, is suffering economically or socially because of the second law of thermodynamics.

Nowhere is this dynamic seen more clearly than in the case of climate change knowledge. Within scientific circles, climate change quickly became a consensus as sturdy as the laws of gravity or thermodynamics. Even if the particulars are fuzzy, knowledge that the climate is warming due to human action is a mundane and noncontroversial scientific truth. But across the boundary demarcating the polity of professional scientists from their publics, the response has been, to put it politely, mixed. Some accept climate change, some reject climate change, and others find clarity of acceptance or rejection muddied by inaccurate, misleading, and often fraudulent claims about integrity of scientific practice and the meaning of scientific consensus (Proctor and Schiebinger 2008). But most often, the response has been a version of what anthropologist Jennifer Carlson has termed "climate ordinariness (Carlson 2019)," the process through which the clarion call of scientific consensus fades into the background noise of everyday life.

Why?

A detour through an overlooked corner of education theory can shed some light on this problem. Over the course of a long career spent wrestling with the unexpected consequences and ramifications of education in the public sphere, the historian Lawrence Cremin formulated the following definition: "I have found it fruitful to define education as the deliberate systematic, and sustained effort to transmit, evoke, or acquire knowledge, attitudes, values, skills, or sensibilities, as well as any outcomes of that effort" (Cremin 1976, 27). Cremin's definition takes in transmission of knowledge but gives the poetics of evocation and the uncertain political outcomes of conveyance equal weight. Knowledge, in Cremin's definition, Shapin's observation, and Carlson's concept, is a call, a summons, and a demand for deliberation and perhaps, action – even if that action is to reject or qualify the evoked or transmitted knowledge (Klemp et al. 2016). In short, knowledge is a challenge oriented towards creating future courses of action (Scroggins 2019).

Within science, the action caused by new knowledge is often routinized, models are reworked, reanalysis is undertaken, and so on. But outside of science, as Shapin notes of climate change, vaccines, and evolution, the call to action is often clearly on display. To riff on Russell's workshop provocation about the skilled trades as knowledge infrastructures, knowledge of a burst pipe is precisely a demand to action – i.e. calling a plumber. But most demands raised by the circulation of knowledge are subtler than the immediacy of a burst pipe. Should you stop eating meat because of climate change? Use fewer paper towels? Signal your virtuousness on social media by making your decisions public? Should we have calculated the carbon cost of this conference?

My point is this: the transmission of knowledge cannot tell the whole story about knowledge infrastructures any more than a narrow focus on the technical constituents of an infrastructure can tell the whole story. Knowledge is, also and always, a call to deliberation and action with uncertain outcomes. This is true even when the action demanded is subtle or the reaction is to ignore, muddy, reject, or normalize troublesome knowledge.

Question 2: The bigger problem today is the proliferation of new forms of KIs and KIs emerging in surprising and unexpected places circulating sketchy knowledge to uncertain effect.

I am going to stick with Cremin for a moment. Another of his insights is that legion are institutions that educate, while narrow is our recognition of institutions as educational (Cremin 1975). We should apply the same principle to identifying and recognizing knowledge infrastructures. To riff again on Russell, skilled trades form a knowledge infrastructure, but so do social circles and conspiracy theories. Following Cremin's lead by thinking broadly about what does and what does not constitute a knowledge infrastructure can help us gain some analytical leverage over the problem of misinformation and "fake news."

One obvious example of this phenomenon is exemplified by the suspect knowledge circulated through political advertisements on Facebook. As the 2016 US election and the Brexit referendum demonstrate, despite the sketchy epistemological status of this knowledge, it powerfully translates into action in the world. Other examples are anti-vaccine subreddits and flat earth Facebook groups, white supremacist groups organizing for action through the Discord gaming network, or the Pizzagate conspiracy that bubbled up from a joke on 4chan and ended in a police action in Washington D.C. These knowledge infrastructures are analytically interesting because they live in the interstices of more formalized infrastructures.

Yet another example of an interstitial knowledge infrastructure is the data circulating inside the university and on third-party servers that Borgman (2018) has termed "grey data." Grey data is data that is neither purely academic nor purely not academic. What might grey data do if it circulates outside the legal bounds of the university, leaving the interstices of the academically protected knowledge infrastructure for the wilds of Facebook and Google?

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