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Lynda Walsh

Decentering Science in Climate Communication

Today, most climate communicators pride themselves on having moved past “deficit” models for communicating climate change—which cast nonexpert communities as ignorant vessels waiting to be filled with an understanding of their climate by experts—and on to various “coproduction” models.¹ These new models present climate knowledge as jointly constructed by expert and nonexpert communities. But they rest on neoliberal logics that privilege technoscientific authority by virtue of its imbrication with global economic development. I will argue in this essay that if we as climate communicators (and scholars of climate communication) truly believe in the “coproduction” of climate-change knowledge, we must question the centrality we have afforded climate science in our models.² We must find alternative models that do not position climate science and scientists as the final authority.

To understand my argument, a very brief history of models for producing and communicating climate knowledge is in order. I will treat the “Modes of Knowledge Production” model as an exemplar, but all major historical schemes exhibit roughly the same logic.³ The Modes model identifies three historical epochs. In Mode 1, knowledge was produced according to an Enlightenment model by academic experts and disseminated through other sectors of society in a roughly linear fashion; this was the dominant mode through the first half of the twentieth century in the Western world, and the one that gave rise to the “deficit model” of science communication.

- 1 Massimiano Bucchi, “Of Deficits, Deviations and Dialogues: Theories of Public Communication of Science,” in *Handbook of Public Communication of Science and Technology*, ed. Massimiano Bucchi and Brian Trench (New York: Taylor and Francis, 2008), 57–76.
- 2 By “climate science” in this essay I am referring collectively to the disciplines represented by Working Group II reports of the United Nations Intergovernmental Panel on Climate Change, namely the atmospheric scientists, paleontologists, dendrochronologists, and other scientists whose data is inputted to our primary technical models and visualizations of climate change.
- 3 On the “Modes of Knowledge Production” model, see Michael Gibbons, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, and Martin Trow, *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies* (London: Sage, 1994). Cf. Elias G. Carayannis and David F. J. Campbell, “‘Mode 3’ and ‘Quadruple Helix’: Toward a 21st Century Fractal Innovation Ecosystem,” *International Journal of Technology Management* 46, no. 3–4 (2009): 201–34; and Harry M. Collins and Robert Evans, “The Third Wave of Science Studies: Studies of Expertise and Experience,” *Social Studies of Science* 32, no. 2 (2003): 235–96.

The primary catalyst for the shift from Mode 1 to Mode 2 of knowledge production was the rise of neoliberalism. Neoliberalism emerged as a response to the state-sponsored reconstruction of European economies after World War II. Its logics aimed to downsize state governments and shift many of their responsibilities—e.g., social services, regulation of industry, environmental protection, education—to private companies who competed in a minimally regulated marketplace. This economic shift, which finally took hold throughout Europe and the Western hemisphere in the 1980s, catalyzed important changes to the relationship between technoscience and society. The resulting “Mode 2” model of knowledge production involved industry in (a) setting goals for basic STEM research—i.e., defining the economic and political problems whose solutions required the manufacture of technoscientific knowledge and/or technologies—and (b) funding this research. Various metaphors have been invoked to describe this entanglement of state, industrial, and academic actors in Mode 2 knowledge production; the dominant one is the “Triple Helix.” In terms of the academic actors, it is primarily STEM academics who serve as gatekeepers of climate knowledge, but humanist academics play this role as well when they receive government or industry funding to work on climate change (e.g., in interdisciplinary institutes or in projects to promote the “science of science communication”). However, the humanities’ greater historical distance from the Triple Helix, and their traditional alignment with civil society, create tensions for humanities scholars working on climate change, as indicated below by the differential respect accorded to STEM and humanities colleagues in interdisciplinary projects.

Recently, Carayannis and Campbell have proposed that we are entering a new mode of knowledge production, which adds the strand of “civil society” to create a “Quadruple Helix” of interactivity.⁴ Citizen science is one example of Mode 3 knowledge production, but so are European research “clusters” that recruit humanist experts to help solve “wicked” problems, and decision-making models that weigh the needs, values, and emotions of stakeholders alongside quantitative criteria.⁵

4 Carayannis and Campbell, “‘Mode 3’ and ‘Quadruple Helix,’” 201–34.

5 “Wicked” problems are problems whose complexity exceeds traditional causal models and which thus resist solutions. The term comes from social planning but has been adapted widely to multi-input, multi-effect problems such as climate change; see Horst W. J. Rittel and Melvin M. Webber, “Dilemmas in a General Theory of Planning,” *Policy Sciences* 4 (1973): 155–69. On Mode 3 knowledge production, see Mary G. Schoonmaker and Elias G. Carayannis, “Mode 3: A Proposed Classification Scheme for the Knowledge Economy and Society,” *Journal of the Knowledge Economy* 4, no. 4 (2013): 556–77, <https://doi.org/10.1007/s13132-012-0097-4>. Terry Shinn, “The Triple Helix and New Production of Knowledge: Prepackaged Thinking on Science and Technology,” *Social Studies of Science* 32, no. 4 (2002): 599–614.

So far, so good for communicators seeking the “coproduction” of climate knowledge. However, on closer inspection, the philosophy underpinning the dominant Mode 2 and Mode 3 theories is still essentially neoliberal: namely, “civil society” is defined in Mode-3 models not as a democratic source of potential resistance to state and industrial interests, but rather as a crowd-sourced pool of “creativity” and free labor that produces “innovation” as a form of capital.⁶ Further, in Mode 3 models, “knowledge ecology”—implying the sustainable exchange of knowledge among equal agents—and “knowledge economy”—implying that knowledge is capital to be traded—are conflated to the point where any rationale for climate research must be justified almost entirely in terms of economic growth.⁷ The resistant potentials of “civil society” or “ecology” to capitalist ventures are thus neatly erased.

There are already troubling signs of the effects of Mode 3 logics. Within the interdisciplinary research “clusters” set up at European institutions to tackle climate change, anecdotal reports from liberal-arts scholars suggest that the dominance of STEM (science, technology, engineering, and math) disciplines under Mode 1 and Mode 2 paradigms persists, meaning “civil” humanist epistemologies are often marginalized in research, or instrumentalized as mere tools to market STEM research. Empirical research into Mode 3 knowledge production in incubators and “science parks” has corroborated these reports, finding that among the four actors in the “Quadruple Helix” (government, industry, academics, and civil society), industrial and entrepreneurial actors have the greatest capacity to act on a global scale.⁸ Neoliberal policies have encouraged these global actors to distribute their operations across the globe while still designing and managing projects from a Western corporate center.⁹ In terms of climate politics, this is vividly illustrated by the recent “Great Garuda” seawall project in Jakarta, whose construction was contracted to a consortium of Dutch engineering firms for \$40 billion and has already displaced thousands of indigenous fishers at locations along the coast.¹⁰

6 Schoonmaker and Carayannis, “Mode 3,” 556–77.

7 Elias G. Carayannis, David F. J. Campbell, and Scheherazade S. Rehman, “Mode 3 Knowledge Production: Systems and Systems Theory, Clusters and Networks,” *Journal of Innovation and Entrepreneurship* 5, no. 1 (2016): 17, <https://doi.org/10.1186/s13731-016-0045-9>.

8 Schoonmaker and Carayannis, “Mode 3,” 556–77.

9 Andrew Herod and Melissa W. Wright, eds., *Geographies of Power: Placing Scale*, (Oxford: Blackwell, 2002).

10 Philip Sherwell, “\$40bn to Save Jakarta: The Story of the Great Garuda,” *The Guardian*, 22 November 2016, <https://www.theguardian.com/cities/2016/nov/22/jakarta-great-garuda-seawall-sinking>.

In short, Mode 3 models—in spite of their lip service to the coproduction of technoscientific knowledge by experts and nonexperts—double down on the neoliberal, “neocorporatist” logics of Mode 2.¹¹ By these logics, the Triple Helix of state, industrial, and academic actors continues to form a nexus through which all knowledge production on climate must be validated. If this is true, it doesn’t matter how many strands get added—whether “civil society” in the Quadruple Helix model or even “the environment” itself in the Quintuple Helix model—the neoliberal Triple Helix will still act as gatekeeper on climate knowledge and communication. This result is surely of grave concern to scholars who wish to advocate for greater responsibility toward vulnerable communities—human and non—suffering both from neoliberal globalization and its climatic effects.

If Mode 3 generates troubling answers to our questions about the role of climate science in responsible climate communication, then what are the alternatives? Looking at recent cases, at least four emerge:

1. Climate scientists and climate-science research groups choose to resist the neoliberal paradigm and serve as advocates for vulnerable communities rather than their state and industrial partners;
2. Civil society and environmental actors resist the neoliberal paradigm and demand a different mode of climate knowledge production that does not exclude their voices when they are heard as resistant or contradictory to technoscientific accounts of climate;
3. Civil society and environmental actors effectively join the Triple Helix by contributing climate knowledge in a format validated by that nexus;
4. Civil society and environmental actors exploit the “multi-level,” “multi-modal” nature of Mode 3 knowledge production¹² to communicate crucial climate knowledge around, rather than through, the “Triple Helix” nexus.

All four of these alternatives are already being enacted with varying degrees of success. In terms of Option 1, we have seen climate scientists such as James Hansen buck state and industrial norms to advocate directly with citizen groups for climate action. Note, however, that Hansen eventually had to relinquish his position at NASA to engage in this resistant behavior. So, while the occasional opposition figure may emerge, climate

11 Shinn, “The Triple Helix and New Production of Knowledge,” 599–614.

12 Schoonmaker and Carayannis, “Mode 3,” 556–77.

science as an enterprise is so entangled in the support system of the Triple Helix that significant resistance by individual scientists or research groups is unlikely.

In terms of Option 2, the examples of resistant civil-society groups are too many to enumerate—from Sea Shepherd and Greenpeace to climate skeptics and “Contrails” protesters outside meetings of the American Association for the Advancement of Science (AAAS). While these efforts may not have a direct effect on the production of climate knowledge, they do shape climate scientists’ communication strategies and habits, and even to some extent the targets of climate research—as evidenced by the decade-long defense of the “hockey stick” graphic that has yielded graphs with ever-longer handles (now dating back 15 million years or so). Instances of resistance by nonhuman environmental actors to the neoliberal paradigm are even more dramatic and provocative—violent hurricanes, algae blooms, droughts, and mud crabs working with Vietnamese shrimp farmers to undermine sea walls. Unfortunately, these resistant acts, instead of generating a revolution of the neoliberal paradigm, have to date resulted in ever more extreme technocratic mitigation and adaptation measures—such as the Jakarta seawall, or Harvard researchers’ proposal to shoot two million tonnes of calcite into the atmosphere.¹³

In terms of Option 3, multiple citizen-science projects have found a way to fit civic and environmental concerns into the logic of the Triple Helix in order to produce climate action: for example, Fukushima radiation monitoring, noise pollution in London, or the GIS-TEMP monitoring project in the US.¹⁴ These projects have varied in their effects on climate justice: a few have produced action on behalf of suffering populations; others have merely provided the Triple Helix with free labor and reinforced its authority to determine what counts as climate knowledge.

Finally, in terms of Option 4, civil-society and environmental actors have found ways to advocate for justice by doing an end-run around the Triple Helix. Ceccarelli documented the efforts of Brazilian activists to block a consortium of scientists and pharmaceutical

13 David W. Keith, Debra K. Weisenstein, John A. Dykema, and Frank N. Keutsch, “Stratospheric Solar Geo-engineering without Ozone Loss,” *Proceedings of the National Academy of Sciences* 113, no. 52 (2016): 14910–14, <https://doi.org/10.1073/pnas.1615572113>.

14 See Ashley R. Kelly and Carolyn R. Miller, “Intersections: Scientific and Parascientific Communication on the Internet,” in *Science and the Internet: Communicating Knowledge in a Digital Age*, ed. Alan G. Gross and Jonathan Buehl (New York: Routledge, 2016), 221–45; and James Wynn, *Citizen Science in the Digital Age: Rhetoric, Science, and Public Engagement* (Tuscaloosa: University of Alabama Press, 2017).

companies from “bioprospecting” in the Amazonian rainforest by launching a “biopiracy” protest campaign that persuaded national lawmakers to deny research permits to members of the consortium.¹⁵ Similarly, numerous towns, cities, and even states in the USA, having observed negative climate effects in their communities with their own eyes, have taken action without waiting for federal support or approval. None of these efforts causes direct or substantial changes to the structure of the Triple Helix; but they do decenter it from its privileged position as the sole authority on climate knowledge and communication.

These climate-communication alternatives all have their strengths and weaknesses, and their success will always be situational. But each alternative effectively destabilizes or decenters the authority of “climate science”: in Option 1, a rogue or resistant scientist fights the Triple Helix; in Option 2, “climate science” is an opponent that helps clarify convictions and strengthen solidarity; in Option 3, it is recruited by a community, almost as a subcontractor; in Option 4, it is a gatekeeper to be dodged. All of these alternatives constitute a significant role change for “climate science” in comparison to Mode 3 paradigms, which make it the centerpiece of a powerful knowledge-production regime driven by neoliberal economic logics. If we are truly interested in the coproduction of climate knowledge and communication, I would argue, we must wean ourselves off our dependence on this regime and find alternatives to use when talking about climate with vulnerable communities.

I spoke very recently with some climate scientists who were exasperated by failed efforts to communicate with a particular vulnerable community that distrusted scientists. “If they don’t believe me,” said one, throwing his hands up in the air, “what more can I do? I’m a scientist; science is what I do.” I didn’t understand him to be advocating the abandonment of the community to its climatic fate; rather, I took him to be insightfully limning his limits as an agent of the Triple Helix. For too long, we have depended on experts like this scientist to tell us what to think and say about climate change. They have done their part and more. Continuing to cede all responsibility for climate communication to the Triple Helix will result in technocratic “solutions” and communications delivered by the only actors with the reach and resources to act on a global scale—transnational corporations. If this is not the climate future we want, it’s time for us to listen to

¹⁵ Leah Ceccarelli, *On the Frontier of Science: An American Rhetoric of Exploration and Exploitation* (East Lansing: Michigan State University Press, 2013).

vulnerable communities express their own climate knowledge and needs, and to put our considerable resources toward advocating for those needs in the best way we know how with the most powerful agents we can find—with or without the aid of climate scientists.

Suggested Further Reading

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