

## Pedagogy and Climate Change

Amy Zhang


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## Chapter 24

### PEDAGOGY AND CLIMATE CHANGE

CHRIS HEBDON, MYLES LENNON, FRANCIS LUDLOW, AMY ZHANG, AND  
MICHAEL R. DOVE

Pedagogy capable of teaching climate change will need to counter the issue's dominant framings, which are shaped by the politics of science and educational expertise. Climate change does not result from a single cause, nor is it amenable to a one-dimensional fix, despite how common it is to hear simple explanations or dismissals of it. To be successful, pedagogies need to foster abilities to think ecologically and to discern how human agency is implicated in this "natural" disaster (Claus et al. 2015). After all, climate change is but one aspect of global change, which, although it has accelerated over the past 300 years, has a longer history throughout the Holocene (Kirch 2005). Global change involves other alterations such as land-use changes, changes in the nitrogen and phosphorus cycles, ocean acidification, chemical pollution, biodiversity loss, stratospheric ozone depletion, global freshwater depletion, and atmospheric aerosol loading (Rockström et al. 2009). All these anthropogenic global changes and the potential ways to affect their course by definition lead back to human action. Thus, pedagogy is not a secondary activity confined to the classroom but an active verb that describes the way people can deal with the multiple social roots of climate change in order to meet its epochal challenges.

Precisely because global change is not one-dimensional in source or effect, understanding it requires a theoretical lens that engages a holistic human-nature system, not fixating on any one thing (for example, carbon) or the failings of one social group in isolation from their wider context. An adequate pedagogical response should not only trace the roots of anthropogenic climate change to its social infrastructures (Sayer 2012) but also help to make visible and sensible possibilities for counterhegemonic action, or how to shift processes of control into reverse (Nader 1997; Stryker and González 2014).

Hierarchy, a long-time concern for anthropology, is centrally relevant to global change. At the macro level we could note that *Homo sapiens*

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collectively appropriate more calories produced on Earth than all other species combined (Barnosky 2009; Speth 2009). In everyday life, hierarchy influences what and how we learn about climate change. Information that is managed and transmitted top-down tends to create not a dialogue or two-way exchange of ideas but a monologue—as in the oft-repeated phrase “we need to educate the public.” Hulme (2009: 217) has called this “one-way flow of knowledge and information” the “deficit model” of science education—it presupposes that one group has the answers while others lack them. This one-way model conceives of education as the filling (by the expert) of an empty bucket (the mind of the recipient).

By narrowly focusing on changing the limited knowledge of ordinary citizens, the deficit model draws attention away from what might be lacking in the knowledge and behavior of the powerful and the ways that different groups have different stakes in climate change mitigation. The deficit model may lead one to overlook the extent to which that hierarchical pedagogy, such as between laypeople and socially distant experts, is *internal* to the problem of climate change. Scientists, for example, may not understand why certain laypeople are unreceptive; while some laypeople may come to resent the way that many climate change discussions valorize expert facts over the knowledge and concerns of citizens struggling with everyday issues (Graeber 2007).

### SOCIAL CLIMATE CHANGE

Dialogical forms of education have been promoted as an alternative to the deficit model since at least Paulo Freire’s writing of *The Pedagogy of the Oppressed* (1970). His work has been elaborated in the field of critical pedagogy (Giroux 1983; Shor 1996; Gadotti 2010), which focuses on how personal experience (biography) relates to wider politics (history). In this model students become teachers and teachers become students. Everyone potentially has something to teach and to learn.

Critical pedagogy represents an oppositional strain compared with mainstream pedagogies, preferring being situated over imperial knowledge and rejecting the idea that while the expert speaks the student should be mute. Importantly, it helps one realize that there are many existing traditions of communication in which people with different skills work together: apprenticeship, cooperation, reciprocal work, town-hall-style democracy, community media, and other forms of mutual learning in which difference can be made productive (Berry 2008; Nader 2010, 2013; Hebdon 2013). A scientist may know what climate change means generally across the state of Montana, but Montanan locals may have the practical knowledge of what their specific farms, forests, and cities need (Scott 1998). Such a situation presents an opportunity for co-developing knowledge and actionable solutions—what Ivan Illich called “science by people rather than for them” (Lohmann 2013: 45).

Pedagogies that help us to deal with the complexities of surviving the Anthropocene will need to bridge knowledge and action, forefronting practical responses already underway in the here-and-now and encouraging critical engagement with them. This approach requires not only attention to how power differentials are at the heart of impasses around climate change but also the linking up of what is learned in the classroom with what can be learned from the politics of the wider world. In the following sections we examine pedagogical dynamics between knowledge, action, and inaction. Drawing on examples from international education, climate science, and renewable energy, we argue that failures to mitigate climate change actively have often co-developed with dominant educational approaches. At the same time, in the wake of these failures there is also an increasing awareness of the need for alternative pedagogical priorities.

### INTERNATIONAL CLIMATE CHANGE EDUCATION

Publications such as the joint UNESCO and UNEP *Climate Change Starter's Guidebook: An Issue Guide for Education Planners and Practitioners* (2011a) and *Youth Xchange: Climate Change and Lifestyles Guidebook* (2011b) offer insights into how international organizations are framing contemporary global campaigns. These campaigns define environmental education as a strategic resource for the mitigation of and adaptation to future environmental impacts and aim to speak to a global audience to advocate action-oriented pedagogy in both formal and informal settings (UNESCO and UNEP 2011a). Although the ways education is interpreted in these campaigns are appealing as progressive measures, a critical reading of them suggests otherwise. These interpretations fall short in several areas: they ultimately perpetuate an uneven division between developed and developing countries; they obscure the ways that production and consumption are connected globally; and they limit broader critiques of the institutions that perpetuate climate change. Moreover, these frameworks of international education introduce an inaccurate dichotomy, rendering developing countries solely as passive victims who must adapt to deal with the impact of climate change and developed countries as those responsible for producing ethically minded consumers.

Critical theorists, including many anthropologists, have argued that efforts to cultivate public consciousness, environmental or otherwise, often portray dominant ideologies as “common sense” (Gramsci 1971; Agrawal 2005). They remind us that we must remain critical of how education contributes to how we think about difference (Foucault 1980). In this context, the 2011 UNESCO and UNEP education campaign reveals a clear parallel between the UN’s two-pronged approach of mitigation (tackling the causes of climate change) and adaptation (dealing with the impacts of climate change) and the assignment of different rights and

responsibilities to so-called developed versus developing nations. Whereas developed countries are called on to limit their contribution to ongoing climate change, developing countries are urged to “prepare learners”—in particular, rural and coastal communities along with economically vulnerable groups such as women—“for uncertain futures” (UNESCO and UNEP 2011a: 57). This implied division of labor establishes two different sets of educational frameworks that delineate and limit conversations around the purpose, goals, and potentials for climate change education. Furthermore, this division of responsibility hampers attention to the political and economic interdependence of developed and developing countries, lessening the possibility that education can or should alter these relations.

The discussions of mitigation in these materials focus exclusively on addressing individual lifestyle choices, most directly the reduction of CO<sub>2</sub> (UNESCO and UNEP 2011b). Within this rubric, environmental education aims to emphasize the connection between lifestyle choices and individual consumption, on the one hand, and climate change, on the other, to ultimately produce citizens who are, above all, responsible and conscientious consumers. *Youth Xchange*—a pamphlet aimed at educating younger audiences—focuses almost entirely on ethical consumption. Although its discussions of personal choices such as controlling energy use through smart meters, developing ethical shopping habits, and choosing mass transport (ibid.) are important, it fails to draw out the connections to larger structural systems or question the dominant ideologies of consumer culture and their implication in climate change. It fails to mention any form of collective response—organized civil action, for example.

In contrast, the dramatically different role assigned to developing countries is exemplified by the striking front page image of Chapter 4 of “Education and Climate Change” in the UNESCO’s *Climate Change Starter’s Guidebook* (2011a). The image is of a group of African school children gathered under a tree, a chalkboard propped up against a truck in this makeshift classroom (ibid.: 54). This picture is a potent reminder that universal access to education remains aspirational in many developing nations. For the vast majority of students like these, the purpose of education is represented as helping them to adapt to inevitable climate change. “New skills,” the pamphlet suggests, “may be necessary to live with members of other ethnic groups and/or cope with a changing physical environment” (ibid.: 57). The report goes on to stress the need to prepare for climate change disasters including the “potential of relocation due to environmental conflicts and wars,” the challenge of “retention of children in schools despite climate change induced poverty” (ibid.: 58), and, ominously, to “prepare learners for uncertain futures” (ibid.: 57). It is clear that under this rubric the role of the global poor is limited to the passive reduction of harm. This framing reinforces the image of victimized members of developing countries who are powerless to confront the causes of climate change.

The separation of mitigation and adaptation in the UN's current approach to environmental education has, in some senses, taken into consideration the unequal distribution of responsibilities. The program calls on developed countries to be responsible for the consequences of their consumption over many decades and recognizes that poorer communities are more vulnerable to climate change. However, their underlying assumptions about mitigation and adaptation reproduce contemporary relations of dependency between developed and developing countries. They obscure how production and consumption are connected globally and drive climate change while also precluding diverse alliances and solutions. **Whereas developed countries have the potential to actively prevent climate change in this framing, developing countries are left to cope with its consequences.**

In sum, international efforts to create a “planetary environmental culture” to combat climate change must first refrain from reinforcing existing uneven power relations. An alternative global environmentalism would go beyond discussions of “educated consumption” for developed countries and “skilled survival” for developing countries. Most notably, international environmental pedagogy would benefit from the “praxis” raised by critical pedagogy (Freire 1970; Giroux 1983; Shor 1996). Such a pedagogy could encourage students to reflect on larger structures of power that shape “common sense,” produce aspirations for consumption, and stall efforts for both mitigation and adaptation to climate change.

### CLIMATE SCIENCE AND DENIAL

Climate scientists have led early efforts in the communication and pedagogy of climate change and remain largely dominant. Yet this is a role in which they do not always feel at ease, in part because the norms of natural science often lead scholars to avoid direct political engagement and self-reflection about the politics of science. Of all self-held ideals, dispassionate objectivity is the main cornerstone among scientists. For much of the 20th century, trust accrued to scientists because of their perceived objectivity and political neutrality, and indeed this perception likely contributed to early successes in convincing governments of the need to take seriously the potential for large-scale anthropogenic climate change.

As climate research matured during the 20th century, it shifted from an understanding that humans had the potential to alter climate to a growing certainty that these changes were already underway. Calls for governmental action intensified, and as economists gained a prominent role, it became apparent that many climate scientists felt uncomfortable discussing the specifics of policy within the norms of economics. As Jamieson notes: “Economists often bring views to the table that are foreign or alienating to natural scientists. . . . [Economists] often assume, for example, that any decision involves winners, losers, and trade-offs . . . [and] that cost-benefit considerations are the foundation of public policy-making” (2014: 27).

Many climate scientists took the view that their role was to communicate the objective reality of anthropogenic climate change, at most only suggesting the need for *some* form of action. The premise was that others could formulate and enact appropriate policy (Hulme 2009).

The realization that mitigation policies would affect the short-term profits of powerful economic interests prompted some of the first climate denial campaigns, which sought to undermine the archetypal image of the impartial scientist. These campaigns highlighted (and often misrepresented) scientists' political activities and commitments and exploited climate scientists' self-conceptions to promote division and anxiety regarding the degree to which scientists should engage in advocacy. They promoted images of career-driven climate scientists seeking tenure and preaching (as "climate alarmists") the likelihood of adverse impacts to elevate the importance of their discipline and so benefit from abundant funding. Those climate scientists that have been vocal advocates of active mitigation risk depiction as insular ivory tower elites promulgating economically regressive policies in subservience to green ideologies (Oreskes and Conway 2011; Mann 2012).

To engage in direct advocacy may thus invite attacks on one's professional integrity, and it may also entail uncomfortable judgments about socioeconomic policy and governance that lie beyond the climate scientists' expertise. Within the climate research community, the label "activist scientist" can be one of disapprobrium, and it can be cited as affecting the integrity of the science (for example, Pielke, Jr. 2010). Despite these pressures, because climate scientists carry an acute burden of awareness of the reality of human-induced climatic change, they may still feel obligated to act beyond strictly academic teaching and communication (Nelson and Vucetich 2009).

While it may be tempting to shelter behind the idea of politically detached science, there are lessons that climate scientists can learn from their experience with climate denialism—for example, regarding the dis-utility (and, at a time of possible environmental crisis, even the immorality) of the pedagogic limitations that their own norms and paradigms impose. Elevating science above other forms of social and political activity invites counterattack and suffers by comparison with forms of engagement that are more egalitarian and reflexive. From this perspective the difficulty is not only "educating the public" but also an introspective challenge for climate scientists. Against a background in which current climate science communication strategies have failed to motivate sufficient social and political action (Jamieson 2014), this increased self-knowledge is urgently needed (Barnosky et al. 2014).

### A HERMENEUTICS OF CLIMATE CHANGE STUDIES

Many climate scientists suggest that public skepticism or outright hostility toward the climate change science is due to either the immature state of this science and/or to failure to communicate—to "educate the public" with—what knowledge we have. Many climate change skeptics are also

focused on public education, but this often consists of state-based efforts to block climate change education in schools (for example, in Virginia and Oklahoma in the first half of 2014). Both sides of the climate change debate share a belief in the importance of knowledge and education, but there is a difference in how education is viewed—as neutral by climate scientists versus partisan by climate change skeptics.

It is clear that the academic/scientific community in general, and the climate science community in particular, was unprepared for the current debate over climate change, especially in the United States, which has the highest rates of denial in the world (Ipsos MORI 2014). It has been suggested that the modern natural sciences never had a “hermeneutics,” a self-reflexive and critical awareness of how they do what they do, which might have better prepared them for this sort of popular miscomprehension. The natural sciences have not had, in Markus’s (1987: 9) felicitous phrase, a “neurosis philosophicus.” The answer to Heidegger’s (2000) question “does science think?” was “no.” It has been suggested that for a long time this was not a problem for the modern natural sciences—that they flourished without it. Indeed they did, up until the recent rise on the American political right of skepticism of science in general and of climate (and evolution) science in particular. Now the long-successful norms of the natural sciences are failing them; the failure to “think” has become a crippling handicap. The norms of modern science may thus be imbricated in the modern attacks on it, including the earlier-discussed norms of detachment and avoidance of political engagement. In this sense, climate science and climate denialism may be said to have co-developed.

Not only has climate science/natural science been caught flat-footed, so have we as social scientists. Some of the most prominent and perspicacious scholars seem to be at a loss to explain climate change denialism (although see Fiske’s chapter in this volume for a discussion of climate skepticism in the United States). One of the most influential economists in the United States, Paul Krugman (2014), in a recent op-ed, implausibly tries to explain “the venom, the sheer rage, of the denialists,” which clearly impresses and disturbs him, in terms of the threat that climate science supposedly poses to the libertarian teachings of Ayn Rand. A more fundamental probing of beliefs on both sides of the debate eludes him.

Scholars who have spent a generation studying the social reproduction of science have mostly balked when it comes to climate change science. Perhaps most famously, Latour (2004: 227) said he would hesitate to critique the methods by which climate scientists claim authority for their findings, because he deems those findings so important: “The danger would no longer be coming from an excessive confidence in ideological arguments posturing as matters of fact—as we have learned to combat so efficiently in the past—but from an excessive *distrust* of good matters of fact disguised as bad ideological biases!” It follows that Latour would



be equally hesitant to rationalize the critiques of climate science methods and findings by the skeptics. All of this is reminiscent of what Ortner (1995) calls “ethnographic refusal”—a reluctance to submit to professional scrutiny the behaviors of those with whom we are in sympathy, such as climate scientists.

In the case of climate change, this reluctance encompasses not only those we support—the climate scientists—but also those we don’t support—the climate science deniers. There has been remarkably little ethnographic attention to the skeptics—Ortner’s point that we have tended to ignore “the lived worlds inhabited by those who resist” (1995: 187–88) seems apropos here—and similarly little attempt to explain this neglect. In short, there are ample grounds for thinking that we also lack a hermeneutics of the social science of climate change.

Real-world events are challenging the hermeneutics—or lack thereof—of climate change scholarship. These events are demanding a more explicit grappling with the central question of the neutrality—perceived or otherwise—of climate science and education, and indeed of science in general.<sup>1</sup> Gregory Bateson offers a possibly useful perspective on this challenge. Bateson always recommended a broad and systemic view of environmental problems, including the way that we study problems and communicate the results of our studies. As he wrote: “The problem of how to transmit our ecological reasoning to those whom we wish to influence in what seems to us to be an ecologically ‘good’ direction is itself an ecological problem” (Bateson 1972: 504). The modern history of the development of climate science and the climate policy regime reveals insufficient attention to—in Bateson’s words—“those whom we wish to influence” and who, by all available evidence, are very clearly *not* being influenced by us.

## RENEWABLE ENERGY AND PROFESSIONAL DENIAL

One of the big surprises of early anthropological works on the politics of the transition to renewable energy was that some highly trained energy scholars harbored unscientific beliefs and made unsound forecasts that impeded this transition. Economists, for example, often held fast to conventional ways of calculating costs and benefits, which excluded environmental and social “externalities” and so made fossil fuels and nuclear energy appear safer and cheaper than they actually were. Physicists and engineers trained to work within the massive infrastructures of the fossil and nuclear industries were often at a loss to comprehend the social, political, and environmental benefits of downscaling their industries and moving toward more democratic, human-scaled, decentralized systems of renewable energy. Many of these energy researchers were little affected by, if not dismissive of, “political” critiques of what they considered to be their “nonpolitical” analyses.

After working between 1976 and 1979 on a National Academy of Sciences project with 300 energy specialists, Laura Nader (1979: 17) concluded: “the toughest problem will be to get professionals to look inside themselves, to see what their mindset problems are.” In subsequent decades, even as fields such as environmental economics became more savvy at calculating externalities into the cost of energy, it became clear that for most energy researchers it was still taboo to consider “the possibility that experts might be part of the problem,” since many an expert “thought that he stood outside of the problem” (Nader 2004: 776).

Hermann Scheer, one of Germany’s political leaders and a supporter of that nation’s *Energiewende* (“energy transition”) since its start in 1991, noted that the “widespread [90%] popularity of renewable energy has developed despite decades of extensive denunciation by the traditional power industry and the majority of energy experts” (2012: 2). Energy analysts often played a counterproductive role in the *Energiewende* by producing incorrect forecasts with a veneer of objectivity—for example, saying in 1990 that “‘exotic’ energies simply don’t offer more than a 5% potential” (ibid.: 24). Germany today produces more than 30% of its energy from renewable sources, and 90% of this investment has come from citizens and their municipalities; only 10% has come from the traditional utility sector, despite its greater access to financing (ibid.: 41). Many energy analysts claimed that it would be impossible for distributed energy to play more than a partial and limited role in the national system, claims that persisted even after renewables repeatedly surpassed previous predictions. Mindsets were harder to change than technologies, probably because the two are not separate, as scholars of “technopolitics” have emphasized (Porter 1995; Edwards 2010).

The German case serves as a reminder that just because someone is trained in science does not mean that he or she will always exercise scientific judgment, especially when dealing with issues beyond his or her specialized experience. Denmark in particular has come up with a more “side-by-side” way to deal with this problem of expert bias. Their renewables law mandates that at least 20% of the ownership of any wind power operation must be opened up to everyone living within 4.5 km of the site, thus bringing locals squarely into the planning process *and* providing them with a new source of income. By 2005, 88% of wind projects were owned by citizen-controlled cooperatives (Sovacool and Sawin 2010: 53). This arrangement works because many Danes recognize that citizens and energy professionals have different kinds of expertise, and thus they can work together and learn from each other. In so doing they are helping to achieve Denmark’s goal of electrical power generation being 100% renewable by 2030 and transportation—by way of electrical trains and cars—being 100% renewable by 2050. As of 2016, Denmark is ahead of schedule. They offer a clear example of the benefits of shifting decision making—and the educational process—away from the deficit model.

## POSSIBILITIES

One of the advantages of an anthropological pedagogy of climate change is that in questioning how dominant approaches operate we can also make visible alternative possibilities. A critical stance can help to reveal ways beyond major impasses. In particular we have called attention to the ways that dominant pedagogical approaches have often been imbricated in ongoing failures to actively mitigate climate change. International education campaigns have too often ignored uneven power relations. Critical pedagogy could address this omission and be used in working toward a new form of global environmentalism. The premise of objectivity among climate scientists, which at times has enabled trust, has more recently become crippling as scientists have interacted with questions of state policy and denial movements that question the need for positive climate policy. This not only suggests that the norms of climate science have co-developed with the modern attacks on it; it also identifies a need to think about climate science itself. In Germany and Denmark, expert claims that renewable energy is “not ready for primetime” have often conflicted with citizen priorities for renewable energy now. In Denmark, this situation has led to a linking up of energy professionals and citizens through wind farm cooperatives, enabling mutual learning and benefit.

The co-development of knowledge and inaction, upon further inspection, suggest their opposite—increasing awareness about what educational forms will be required for effective action. In all cases there is a need for critical attention to social power and for reframing educational questions within wider contexts. Rather than simply a problem of carbon in the sky, these critical approaches redirect our attention to how inequalities are involved in the social production of global change from the ground up.

## NOTE

1. A summer 2014 bill introduced into the U.S. Senate proposes to fund a blue ribbon commission to “enhance scientific regard among the American public.”

## REFERENCES

- Agrawal, A. 2005. *Environmentality*. Durham, NC: Duke University Press.
- Bateson, G. 1972. *Steps to an Ecology of Mind*. New York: Ballantine.
- Barnosky, A. D., et al. 2014. Introducing the scientific consensus on maintaining humanity’s life support systems in the 21st century: Information for policy makers. *The Anthropocene Review* 1(1): 78–109.
- . 2009. Approaching a phase shift in Earth’s biosphere. *Nature* 486.
- Berry, W. 2008. Faustian Economics. *Harpers* (May).
- Claus, A., Osterhoudt, S., Dove, M. R., Baker, L., Cortesi, L., Hebdon, C., and Zhang, A. 2015. Disaster, degradation, dystopia, in R. Bryant and S. Kim (Eds.), *International Handbook of Political Ecology*. Cheltenham: Edward Elgar.
- Edwards, P. 2010. *A Vast Machine*. Cambridge, MA: MIT Press.

- Foucault, M. 1980. *Power/Knowledge*, C. Gordon (Ed). New York: Pantheon.
- Freire, P. 1970. *Pedagogy of the Oppressed*. New York: Continuum.
- Gadotti, M. 2010. Reorienting education practices toward sustainability. *Journal of Education for Sustainable Development* 4: 203–10.
- Giroux, H. 1983. *Theory and Resistance in Education*. Westport, CT: Bergin & Garvey.
- Graeber, D. 2007. An Army of Altruists. *Harpers* (January).
- Gramsci, A. 1971. *Selections from the Prison Notebooks*, Q. Hoare and G. N. Smith (Eds. and Trans.). London: Lawrence & Wishart.
- Hebdon, C. 2013. Activating pedagogy. *Kroeber Anthropological Society Papers* 102/103.
- Heidegger, M. 2000. Gesamtausgabe, Band 16. *Reden und andere Zeugnisse eines Lebensweges (1910–1976)*, H. Heidegger (Ed.). Frankfurt: Vittorio Klosterman.
- Hulme, M. 2009. *Why We Disagree about Climate Change*. Cambridge: Cambridge University.
- Ipsos MORI. 2014. *Public Attitudes to Science 2014*, [www.ipsos-mori.com/Assets/Docs/Polls/pas-2014-main-report.pdf](http://www.ipsos-mori.com/Assets/Docs/Polls/pas-2014-main-report.pdf)
- Jamieson, D. 2014. *Reason in a Dark Time*. Oxford: Oxford University.
- Kirch, P. V. 2005. Archaeology and global change. *Annual Review of Environment and Resources* 30.
- Krugman, P. 2014. Interests, ideology, and climate, June 8, *The New York Times*.
- Latour, B. 2004. Why has critique run out of steam? *Critical Inquiry* 30(2): 225–48.
- Lohmann, L. 2013. *Energy Alternatives*. Dorset: Corner House.
- Mann, M. 2012. *The Hockey Stick and the Climate Wars*. New York: Columbia University Press.
- Markus, G. 1987. Why is there no hermeneutics of natural sciences? *Science in Context* 1(1): 5–51.
- Miller, D. 2012. *Consumption and Its Consequences*. Cambridge: Polity.
- Nader, L. 1979 [2010]. Barriers to thinking new about energy. *The Energy Reader*. Oxford: Wiley-Blackwell.
- . 1997. Controlling processes. *Current Anthropology* 38(5): 711–37.
- . 2010. Side by side: The other is not mute, in A. Iskandar and H. Rustom (Eds.), *Edward Said*. Berkeley and Los Angeles: University of California Press, pp. 72–85.
- . 2013. *Culture and Dignity*. Malden, MA: Wiley-Blackwell.
- Nelson, M. P., and Vucetich, J. A. 2009. On advocacy by environmental scientists. *Conservation Biology* 23(5): 1090–1101.
- Oreskes, N., and Conway, E. M. 2011. *Merchants of Doubt*. London: Bloomsbury.
- Ortner, S. 1995. Resistance and the problem of ethnographic refusal. *Comparative Studies in Society and History* 37(1): 173–93.
- Pielke, R., Jr. 2010. *The Climate Fix*. New York: Basic.
- Porter, T. 1995. *Trust in Numbers*. Princeton, NJ: Princeton University Press.
- Rockström, J., et al. 2009. A safe operating space for humanity. *Nature* 461.
- Sayer, N. F. 2012. The politics of the anthropogenic. *Annual Review of Anthropology* 41.
- Scheer, H. 2012. *The Energy Imperative*. London: Routledge.
- Scott, J. C. 1998. *Seeing Like a State*. New Haven, CT: Yale University Press.
- Shor, I. 1996. *When Students Have Power*. Chicago: University of Chicago Press.
- Sovacool, B., and Sawin, J. L. 2010. Creating technological momentum. *Whitehead Journal of Diplomacy and International Relations* 11(2): 43–57.
- Speth, J. G. 2009. *The Bridge at the End of the World*. New Haven, CT: Yale University Press.
- Stryker, R., and González, R. (Eds.). 2014. *Up, Down, and Sideways*. New York: Berghahn.
- UNESCO and UNEP. 2011a. *Climate Change Starter's Guidebook: An Issue Guide for Education Planners and Practitioners*. Paris: UNESCO and UNEP.
- . 2011b. *Youth Xchange: Climate Change and Lifestyles Guidebook*. Paris and Nairobi: UNESCO and UNEP.