Discursive diversity in introductory environmental studies

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Abstract
Introductory environmental studies and sciences (ESS) classes can be powerful and formative experiences for undergraduates. Indeed, instructors likely aspire towards influencing and enhancing the perspectives, analytical tools, and critical-thinking skills their graduates carry forward into careers in and beyond environment-related fields. This task, however, is doubly challenging: not only to meaningfully engage students with environmental issues but ideally also to think critically about the at-times competing ideologies and perspectives in ESS. This requires that courses be taught in ways that further critical thinking, develop metacognitive skills, and introduce students to a diversity of environmental discourses. In this paper, we present the results of a brief empirical survey of a small sample of North American ESS undergraduate programs. Using discussions of climate change as an example, we pay particular attention to the explicit goals, diversity of literature presented, and organization of the courses, using typologies e.g., Nisbet (Wiley Interdiscip Rev Clim Chang 5(6):809-823, 2014) to highlight the prevalence of particular environmental discourses and not others. We highlight a handful of promising practices and potential blind spots in the pedagogical design of these courses, while arguing for the importance of instructor reflection, iterative improvement, and further research into potential common weaknesses in ESS instruction.

Keywords Environmental studies; Environmental science; ESS; Curriculum; Pedagogy; Environmental discourses; Educational evaluation

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Prologue

A recent graduate from a small, liberal arts college, co-author Ho was significantly shaped by her experiences as an undergraduate in environmental studies. The vignette recounted below captures the motivation for this research, and the value that the co-authors—both graduates from ESS faculties—have gained from encountering multiple environmental discourses.

> My undergraduate education in environmental studies was as much a visceral experience outside the classroom as it was an academic journey. Both Bill McKibben's success in building a global grassroots climate movement and Michael Pollan's writings on the atrocities of the industrial food system motivated me to think about what my role was in mitigating these terrifying global problems, even before I enrolled in my first environmental studies course.
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> In the classroom, I was thrilled to be introduced to the "canon" of North American environmental writing, which contained the philosophical underpinnings of the contemporary environmental thought I already identified with. Aldo Leopold inspired me to always see myself and my actions in the context of the ecosystem, while Garrett Hardin gave me a framework for understanding our failure to manage our global atmosphere and oceans. Later, reading contemporary writers helped crystallize these philosophical tenets into practical solutions.[1] In particular, Elizabeth Kolbert (2006) and Jones et al. (2008) gave me the understanding I needed to tackle the climate issue: that fossil fuel corporations were to blame, that we had a suite of low-carbon technologies we could deploy immediately,[2] and that grassroots solutions held promise.[3] It was not until I took an upper-level Political Science class on renewable energy and participated in a post-graduation summer fellowship at an environmental think-tank focused on developing novel environmental paradigms that I began to diagnose the problem a little differently. I came to see the transition to a clean energy economy as an issue requiring technological innovation and deployment, in addition to simply being caused by insufficient climate awareness or the inefficient pricing of fossil-based energy. Nuclear power, an energy solution I seldom encountered in my classes except in the context of the negative health impacts of uranium mining, became a default alternative energy option in my mind. My fellowship experience, in particular, placed an emphasis on engaging with unconventional perspectives on the environment, and the networks I developed there continue to challenge my thinking on climate change in novel ways.
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> Several of the concepts I internalized in my introductory ESS experience certainly still guide me in my environmental economics research today, and the passion I developed as a student activist continues to motivate my work. Yet, in many ways, I would have appreciated being exposed to a greater diversity of perspectives and solutions earlier in my education so that I could have learned to wrestle with these controversial perspectives alongside my environmentally minded peers. With an increasing number of environmental thinkers proposing novel ideas in ideological silos and debating them in polarized spaces, I believe that creating an ideologically diverse learning environment for students of ESS at an early stage is essential. This will empower them to engage with these ideas in a critical way that both refutes traditional assumptions that are no

[1] These included writings by Vandana Shiva (on water privatization), Wangari Maathai (on reforestation), and Nancy Langston (on toxics).

[2] Kolbert presents Pacala and Socolow (2004)'s stabilization wedges, which describe currently available low-carbon energy technologies (see footnote 15).

[3] Kolbert discusses the growing grassroots climate movement in Burlington, Vermont, while Jones advocates building a movement to simultaneously create jobs and improve home energy efficiency.

longer supported and reaffirms the fundamental tenets of environmental thought essential for protecting the health of our ecosystems.

Introduction

According to the Association for Environmental Studies and Sciences, there are roughly 1500 environmental studies and sciences (ESS) programs in American universities alone.[4] While these programs are diverse in their research areas and degree requirements, many are tied together by normative ambitions to "vision and build a just and sustainable world"[5] and to work "locally, nationally, and internationally... to address the world's environmental challenges."[6]

Yet, how we achieve these aims remains highly contentious. Environmental thought has often included contrasting and competing perspectives, such as the classic debate between Conservationists, who emphasized the sustainable management of nature for human uses, and Preservationists, who championed the protection of nature free of any traces of human development (Callicott 1990). Likewise, the Ehrlich-Simon wager in 1980 questioned whether the earth's resources could only support a finite human population (Simon 1995). Today, academic and public debates continue to resound about both theoretical (the preferability vs. irreversibility of the Anthropocene, e.g., Hamilton 2014; Vaidyanathan 2014; and the ethics of putting a price on nature, e.g., Monbiot 2014) and practical (whether local or globalized food systems are more sustainable, e.g., Boisvert 2014) issues.

This diverse and often polarized ideological terrain poses ESS programs with the challenge of accommodating contrasting discourses, defined by political scientist John Dryzek as "shared way[s] of apprehending the world" that rest "on assumptions, judgments, and contentions that provide the basic terms of analysis, debates, agreements, and disagreements" (Dryzek 2013). For example, two typical typologies of discourses categorize environmental thought and thinkers into distinct clusters: environmental problem solving, limits and survival, sustainability, and green radicalism (Dryzek 2013); or market liberals, institutionalists, bioenvironmentalists, and social greens (Clapp and Dauvergne 2005). While these categories are not necessarily mutually exclusive, there are definite tensions between some of them, with market liberals, for example, stressing the importance of economic growth for the simultaneous achievement of human welfare and environmental goals, and bioenvironmentalists arguing that the consumption-based model of economic growth is responsible for the stress that humans have put on the earth's biological limits. More recently, contemporary public intellectuals in the climate change space have been categorized into ecological activists, smart growth reformers, and ecomodernists (Nisbet 2014). The challenge of integrating and teaching these disparate discourses has, on occasion, been highlighted in earlier reflections on ESS curriculum development (see Soule and Press 1998).[7]

In this paper, we argue that in order for students of ESS to be prepared to critically evaluate and reflexively adopt environmental perspectives, those designing ESS curricula should ensure that students are exposed to a wide variety of empirically grounded ideas and equipped with the metacognitive skills needed to interrogate each. In what follows, we offer an exploratory study of the pedagogical design of introductory ESS classes as represented through their syllabi and reading assignments. After discussing a wider survey, we focus our analysis on 22 syllabi from across North America, highlighting both

[4] http://www.aess.info/content.aspx?page_id=22&club_id= 939971&module_id=35440
[5] http://www.brown.edu/academics/institute-environment-society/about
[6] http://www.colby.edu/environmentalstudies
[7] Other scholars consider complementary challenges in ESS, such as the importance of multi- and interdisciplinarity (see, e.g., Steinhart and Cherniack 1969; Maniates and Whissel 2000, and Clark et al. 2011).

promising practices and potential problems with underrepresenting discursive diversity on key issues. Using climate change as one example among many, we argue that better representing this diversity is crucial for equipping students in the content and critical thinking required in ESS.

The landscape of introductory ESS classes: data and methods

To document the range of environmental discourses taught in introductory ESS classes, we conducted an empirical survey of a small sample of course syllabi. We focused on introductory courses for their centrality in ESS students' academic development, but also because these introductory classes may be the only exposure to ESS that non-major students experience. We contacted professors and staff at 41 university ESS departments across North America, selecting the top 25 ranked schools from a recent QS World University Rankings' ESS category and an additional 16 liberal arts colleges via a recent US News ranking. We asked for them to identify and provide the syllabus for the primary introductory ESS course or courses in their ESS programs and/or taken by a large number of non-majors. To improve the return rate, the request included a commitment neither to disclose the particular courses or institutions sampled nor associate observations with individual courses or instructors. Often, this involved contacting the instructors directly. In many cases, we were able to find current or recent syllabi posted publicly online as well, which were included. In some cases, this represented several different introductory courses from a planned sequence; in others, it included multiple variants of the same course when different instructors used significantly different approaches. In total, we obtained 53 syllabi from 22 major research institutions and 6 liberal arts colleges.

The introductory syllabi we analyze here are limited both in number and their ability to reveal how content is taught in class. Indeed, to systematically document the diversity and criticality of ESS instruction would be a significant project, requiring more detailed syllabi, in-class assessment of how content is presented, and follow-up with students. Our goal in analyzing these course syllabi, therefore, is not to draw conclusions about the extent of discursive diversity in North American universities, but rather to evidence the need for further research on whether this outcome is being achieved. As well, we aim to highlight some concrete examples of best practices and potential blind spots in course instruction surfaced by our empirical survey. These should serve as resources for further discussions on how ESS instruction can both expose students to a greater diversity of discourses and equip them with the criticality necessary to engage with them.

A few general trends were immediately evident. Just under half of the 53 syllabi (22) were for environmental or earth science classes, with a strong or exclusive focus on "non-human" topics (e.g., hydrological cycle or plate tectonics). The remaining 31 were split between environmental studies, sustainability, and policy approaches. The syllabi also varied in the level of detail they provided, ranging from a single page with little beyond administrative requirements to ten-page documents with extensive reading lists, thorough class-by-class schedules to assist with student preparation, or links to online resources and skills-training opportunities.

For more detailed analysis, we selected 22 of the environmental studies/sustainability/policy syllabi that provided sufficiently thorough information about the course (e.g., extended reading lists, lesson summaries, or extensive descriptions, among others) to assess their content and the materials used. We coded the course descriptions, objectives, and session topics according to whether or not there were explicit references to certain themes and topics. Importantly, we erred towards over reporting the presence of these elements when in doubt about ambiguous phrasings or passing references to avoid concerns about downplaying the diversity or variety of material presented in the syllabi.

Findings, promising practices, and challenges

We first examined the summary descriptions and stated goals of the courses to understand the extent to which instructors explicitly acknowledged the existence of multiple discourses and importance of critical thinking. A few trends were readily observable:

- Half of the courses (11) explicitly referenced equipping students to solve environmental problems, with 7 of those focusing entirely on personal lifestyle changes.
- Less than half (10) made any reference to the fact that there were competing or contested solutions to environmental problems.
- Only 8 referenced (a) a desire to encourage critical thinking, (b) debates or controversies they would explore, or (c) theoretical divergence in ESS literature.
- Fewer still (7) referenced either (a) ESS being a multi-, inter-, or transdisciplinary field or (b) made explicit references to drawing on materials, methods, or theories from multiple disciplines.

A handful of syllabi included promising practices towards presenting diverse viewpoints, such as one course that featured a session examining the recent debates between Andrew Revkin and Clive Hamilton on the meaning of a "good Anthropocene" (Johnson 2014), another that used provocative weekly questions to interrogate common environmental positions, or two that presented contrasting theories of environmentalism. Two courses also dedicated sessions to the interaction between science and policy, including specific examples of critically examining environmental claims and positions. One class in particular presented anthropological perspectives on the roots of environmentalism in countries around the world.

Diversity of perspectives in instructional materials

To further examine the extent of discursive diversity in these courses, we also examined the instructional materials used, including films, popular press books, and other assigned readings. Particular focus was given to whether classes balanced the discourse and perspectives they were presenting with contrasting environmental viewpoints, relying heavily on existing typologies of discourses in the scholarly literature as benchmarks. We found significant variation in the extent to which courses used diverse materials, but generally that they did a better job of representing a plurality of perspectives on the more "classic" or well-known debates in environmental thought, such as the debate between Conservationists and Preservationists, than on some currently politicized debates in the areas of climate change and food policy.

Debates between Garrett Hardin and Elinor Ostrom, between the Conservationists and the Preservationists, between Lord Nicholas Stern and William Nordhaus over the social cost of climate change (Stern 2006; Nordhaus 2007), and around the ethics of ecosystem service valuation were frequently represented, with at least half of the classes exploring one side of the argument also explicitly presenting the other. Four of the eight classes that had students read Hardin's "Tragedy of the Commons" also accompanied this reading with either Ostrom's critique of Hardin's theory Ostrom et al (1999) or a piece of secondary literature that referenced her work.[8] Of the five classes that listed writings by John Muir, three also included writings by Gifford Pinchot. Three other course syllabi also listed

[8] These classes mentioned Hardin in the context of common property resources. Some others mentioned him in the context of population growth and climate change but in these cases, it does not make sense to balance it with Ostrom.

works by contemporary writers with less conventional perspectives on conservation,[9] such as Kareiva et al. (2011). Two of the four classes that presented environmental valuation as a policy strategy did so in a critical way.[10]

However, contrasting perspectives were only presented on some issues—namely, more academic, historical, or theoretical topics, rather than contemporary policy issues. Discussions of climate and energy policy, for instance, tended to underrepresent discursive diversity.[11] Yet, climate change in particular is a highly contested issue (Hulme 2009; Dryzek 2013; Nisbet 2014) that requires navigating competing world-views as well as understanding the degree of uncertainty embedded in information portrayed as being objective and accurate (e.g., the technological potential of different alternative energy options, Loftus et al. 2014). Nisbet (2014) provides a typology for understanding the diversity of discourses in this area, categorizing public intellectuals into ecological activists, smart growth reformers, and ecomodernists (2014, see Table 1).

Typology of Intellectuals	**Problem Framings**	**Policy Prescriptions**
Ecological Activists *Bill McKibben*, *David Suzuki*, *Clive Hamilton*, George Monbiot, *Naomi Klein*, Paul Kingsnorth	Capitalism; consumerism has exceeded the carrying capacity of the planet; risk of catastrophe/collapse	Call for strong regulation of industry; rationing energy use; localization of economies, food systems, and governance
Smart Growth Reformers *Thomas Friedman*, Al Gore, *Nicholas Stern*, Jeffrey Sachs, *Amory Lovins*, *Robert Socolow / Stephen Pacala*	Climate change is ultimate market failure; can be corrected by putting price on carbon; progress blocked by 'deniers'	Call for binding international agreement, national carbon pricing, and government investment in innovation.
Ecomodernists Stewart Brand, *Mike Hulme*, *Roger Pielke Jr.*, *Steve Rayner*, Ted Nordhaus / Michael Shellenberger, *Andy Revkin*	Environmental problem & market failure is misdiagnosis; should be re-framed as energy innovation & societal resilience challenge	Argue for portfolio of 'clumsy' policy approaches across levels of society; government investment in energy technologies; and resilience strategies.

Table 1. Public intellectuals and their framing of the climate problem. Italicized are the names of authors assigned in the syllabi sampled. Socolow and Pacala are our own additions not included in Nisbet's original typology.[12] Adapted from Nisbet (2014).

[9] These perspectives involve, for instance, a strong recognition of human populations' economic dependence on natural areas (Kareiva and Marvier 2012).

[10] George Monbiot is a leading critic of ecosystem valuation (see Conniff 2012).

[11] Food policy is another issue whose pedagogy in classes is worth studying in further research. Of the 11 classes that specified the readings that they assigned on food and agriculture issues, five assigned excerpts from or the complete text of Michael Pollan's "The Omnivore's Dilemma" without accompanying it with contrasting perspectives. Further research could seek to understand exactly what points Pollan's book is being used to illustrate in classes, as well as characterize the diversity of perspectives around food policy in the same way that Nisbet (2014) has done for climate change.

[12] Pacala and Socolow (2004)'s concept of stabilization wedges emphasizes that society has the technologies necessary to stabilize carbon emissions at a safe level by mid-century, and that smart policies to scale these technologies (efficient vehicles, efficient buildings, nuclear power, renewable energy, carbon capture and storage) can help us achieve this stabilization.

A total of 14 syllabi specified the readings they assigned on climate change and energy. In general, these courses framed the problem of climate change and propose policy solutions in ways that are congruent with the first two categories of thinkers, focusing on the catastrophic consequences of climate change, climate denial among politicians and the public, pricing carbon, the intergenerational ethics of climate change, and the potential for currently available low carbon technologies to meet our energy needs. Only one syllabus made explicit mention of climate adaptation as a necessary policy response.[13]

Of the 22 detailed course syllabi surveyed, we found that less than half explicitly mentioned the importance of critical thinking or exposing students to competing perspectives. When diverse perspectives were presented in the instructional materials used, these were generally limited to the classic paradigm debates in environmental thought. Materials assigned in classes about climate change, the most pertinent environmental issue today, were significantly less diverse in the perspectives they presented.

A possible explanation for this lack of diversity could be that climate change is a very broad issue with multiple dimensions that are difficult to cover in an introductory class. Yet, given that climate change is a highly politicized issue that invites a diversity of perspectives on possible solution pathways, each claiming to rely on "objective" science, it is ever more crucial for students of ESS to be able to wrestle with contrasting ideas and design policies based on sound information.

Some numbers help to illustrate this lack of diversity based on Nisbet's framework. Of the 14 classes, 9 assigned at least one reading from the writers listed in Table 1. Yet, only two syllabi included voices from two discursive groups, and only one class featured all three. The remaining courses only included readings from a single viewpoint (three featured exclusively smart growth reformers, and three only ecological activists).

As an example of how some courses constructively presented diverse perspectives, one course presenting the Jevons Paradox (that energy consumption increases as energy efficiency increases) contrasted this with an article arguing that this "rebound effect" has been overemphasized. Similarly, one of the classes that assigned readings about Pacala and Socolow's stabilization wedges also assigned an article that questioned whether their scenarios were realistic (Davis et al. 2013). Another course assigned a National Geographic article weighing the costs and benefits of several different types of alternative energy options, including solar, wind, nuclear, biomass, and carbon capture (Parfit, n.d.).

This tendency towards representing only one view on contentious issues was repeated on other topics. The Tragedy of the Commons was discussed in eight classes, though only four engaged with more than one perspective (e.g., Hardin vs. Ostrom). Similarly, only half of the four classes that studied ecosystem service valuation included content or readings from more than one viewpoint. Just over half of the courses discussing Conservationist or Preservationist positions discussed both, while only one third of those presenting either ecological activists, smart growth reformers, or ecomodernists featured more than one of those categories.

One critique of this finding would be to suggest that issues of critical thinking and discursive diversity were dealt with in a more generalized way throughout the course. Even when syllabi mentioned key learning outcomes like "assessing competing solutions," "critical thinking," "interdisciplinary skills," or "systems thinking," however, questions remained about whether they were actually being achieved. For instance, many courses flagged climate change as an opportunity for critical thinking and debate—yet the

[13] Note this does not include classes that discussed the Kyoto Protocol. These classes may or may not have touched on the adaptation finance mechanisms under the Protocol.

only debate present in the materials listed was the "debate" between the scientific consensus and climate denial. Introducing greater discursive diversity, on the other hand, could include facilitating debates about possible energy pathways to address climate change, grappling with the effectiveness of current education and outreach strategies, or thinking critically about calls for reducing per capita energy consumption.

Working towards discursive diversity

Environmental discourses play a powerful role in shaping, framing, and even limiting policy debates and possible futures. We suggest, therefore, that it is important to educate students about not only today's environmental challenges but also the comparative strengths and limitations of the possible pathways towards addressing them. As Steve Rayner (1989, in Nisbet 2014) argues, "progress lies not in our choosing one position on that terrain and then rejecting those that are in contention with it, but in recognizing and understanding all these positions and then finding ways of negotiating constructively between them." We argue that empowering ESS students to "negotiate constructively" depends in part on the diversity of perspectives they are exposed to at an early stage in their education, and the criticality with which they are encouraged to read these perspectives.

To be clear, we are not suggesting that ESS classes ought to teach false or manufactured controversies (e.g., climate change denial) nor abdicate a responsibility to study and articulate concerns about environmental impacts. ESS does, however, have a responsibility to problematize common assumptions (e.g., nature as pristine), encourage students to think critically about messages in popular media (e.g., the connections between climate change and weather disasters; see Pielke 2014), and remain open to considering many possible pathways towards sustainable ends (e.g., renewables vs. nuclear). Indeed, this is precisely why it is crucial for instructors to teach students how to ask hard questions about environmentalism: On the surface, the difference between unsubstantiated "skepticism" and constructive critical inquiry can sometimes be difficult for students (and even experienced researchers and instructors) to see. If ESS courses could teach students to ask good questions, that alone would be an outcome worth celebrating.

Our study has highlighted a few promising practices that could be illustrative for other institutions interested in increasing the diversity and criticality already present in some ESS courses. At a broad level, we recommend that ESS instructors:

- Explicitly acknowledge the existence of diverse perspectives on environmental issues, and balance perspectives and discourses with critical counterpoints
- Equip students to seek out, understand, and reflect on productive critical perspectives (e.g., varying discourses) from a position of intellectual humility
- Design classes that help students reflect on the epistemological origins of environmental thought beyond the "popular narrative" of US environmentalism; for instance, by introducing cross-cultural perspectives on environmentalism
- Particularly with politicized and "wicked" environmental debates such as climate change, in which students may be heavily involved beyond the classroom:
    - Include materials that encourage critical thought about the assumptions inherent in any recommended pathway (e.g. Loftus et al. 2014; Nisbet 2014)
    - Teach about the use and misuse of science in political debates not only in the context of climate denial, but also as it applies to evaluating possible strategies or energy options (e.g. Kahan 2010; Pielke 2007)
    - Equip students with frameworks to integrate diverse goals, values, and sources of

information into coherent policy agendas (see, e.g., Verweij (2006) on "clumsy solutions")

These are challenging recommendations. No definition exists for "sufficient discursive diversity," which suggests that reflexivity, time, and iterative improvement will be essential in determining which perspectives warrant inclusion in introductory courses. Moreover, the demands of teaching—limited time, competing pedagogical goals, and the wide variety of student abilities—make prescriptive solutions unlikely to be successful. Particular attention must also be given to ensuring that students feel empowered, rather than paralyzed, by the discursive complexity intrinsic to ESS. Despite these challenges, finding ways to incorporate meaningful discursive diversity into ESS courses is essential to equipping students to engage with environmental issues throughout their lives in reflective, informed, and critical ways.

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