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# The Worldwide Spread of Environmental Discourse in Social Studies, History, and Civics Textbooks, 1970–2008

PATRICIA BROMLEY, JOHN W. MEYER, AND FRANCISCO O. RAMIREZ

The world environmental movement has gained much strength in recent decades and has led many nations to focus on environmental education. We examine the extent to which this global movement has helped change national textbooks. We also consider the effects of national development, national policy on environmentalism, and the general expansion of postnational curricular emphases on human rights, student empowerment, internationalization, and social scientific perspectives. We analyze the content of 484 secondary school social studies textbooks from 65 countries, finding increased attention to the environment that parallels both world environmental crises and the closely related rise of world environmentalism. Our analyses suggest that the increasing prevalence of environmental topics in textbooks is influenced by broad global cultural and environmental change more than by national conditions.

Since the 1950s, a worldwide environmental regulatory regime has expanded dramatically. International treaties and national laws have proliferated along with international organizations. In part, this proliferation was driven by social movements reflecting international, national, and local mobilizations in response to environmental crises. In addition, a great worldwide expansion in scientific activity influenced and legitimated all of these changes. The worldwide ascendancy of scientific authority has greatly facilitated the environmental movement and its response to rapidly worsening environmental conditions (Frank et al. 1999, 91–93).

As with other changes in world society over the period—from the expansion of human rights emphases, to a greater emphasis on international peace and understanding, to the celebration of transparent forms of political

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and social organization—the environmental regime’s initial focus on political power and legal systems has broadened to include a commitment to environmental education. Both formal educational institutions and less formal public media are expected to reflect urgent environmental considerations. Thus, national curricular policies for elementary and secondary education increasingly include environmental components (Benavot and Amadio 2005; Rosenmund 2006, 180–81), often linked to established curricula in science, social studies, and hygiene and health.

In this article, we assess the effect of this broad effort on one central feature of the educational system—the textbook. We survey 484 social studies textbooks from 65 countries over the period 1970–2008 to see when and where books include an explicit emphasis on environmental issues and problems. Our data set, originally developed to study human rights education, covers the fields of history, civics, and social studies (which we term generally “social studies”). Our selection includes books intended for junior and senior secondary school use. While we do not have a representative sample of textbooks in any strict sense, nor do we include science or geography texts, we have content information on books from every region of the world and from educational systems in both developed and developing countries.

The issues we are concerned with are simple and basic. First, have the expanding global environmental movement and the environmental crises to which it responds led to general and worldwide increases in textbook emphasis on the environment? Many theories would suggest such effects, and the notion of strong world influences is central to sociological institutional theories that have been useful in comparative analyses of educational change in the post–World War II era (Meyer, Boli, et al. 1997; Baker and Wiseman 2006).

Second, is environmental education, as it appears in the textbooks, sharply distinct, or is it linked to a whole cluster of what we may call “post-national” curricular changes, stressing human rights in addition to traditional citizenship, diverse society rather than the unified national state, and international pictures of social life? Some theories might assume there are distinctive pressures and problems at the national level that are posed by local environmental problems, aided by strong national environmental interests and organizations. In contrast, institutional theories emphasize the more diffuse aspects of global environmental doctrines and their influence. These theories emphasize the effect of global cultural frames on national education and related developments (Meyer and Ramirez 2000, 123–24). Our investigation allows us to consider the impact of both types of effects.

Third, in what sorts of countries does environmental education flourish? Is it especially characteristic of more developed and democratic countries in the core of the world as part of a general model? Alternatively, is environmental education affected by distinctive national environmental problems?

School systems historically emerged and gained legitimacy as institutions linked to the nation-state and designed to produce national citizens (Ramirez and Boli 1987, 10). National education authorities expected social studies textbooks to reflect national curricular frameworks and goals associated with the production of good citizens. Good citizens, in turn, were expected to be mainly attuned to national issues and concerns. On the one hand, the powerful historical legacy of nationalism would lead us to expect that a national focus dominates the discussion of environmental issues in social studies textbooks. If, on the other hand, the environmental movement is a worldwide dynamic and discourse, then its emergence and spread in textbooks should be more transnational or global in character (Meyer and Ramirez 2000, 119–20).

Our research is designed to ascertain whether environmental emphases in school textbooks are on the rise throughout the world. Alternatively, has this rise been limited to particular areas and nations? To answer these questions, we look at cross-national patterns of environmental discourse in textbooks. We then use hierarchical generalized linear models of analysis to estimate the influence of world, country, and textbook characteristics on discussions of the environment.

### **Background**

An extensive literature documents the enormous post–World War II expansion in the world’s environmental regime. Studies show that the number of international environmental treaties and governmental and nongovernmental organizations (NGOs) increased rapidly in this period (Meyer, Frank, et al. 1997, 625; Boli and Thomas 1999, 23–24; Frank 1999; Frank et al. 1999, 85), and detailed qualitative studies of the expansion document the changes (e.g., Wapner 1996). Quantitative studies also show changes at national levels in countries around the world (Frank et al. 2000, 98; Hironaka 2002, 66–67; Schofer and Hironaka 2005, 36–38), and qualitative case studies spell out the processes in particular countries (e.g., Broadbent 1998). Scholars assessing globalization as an instance of governance without government and as a case of transnational norm formation discuss the global environmental regime (e.g., Therborn 2000, 175).

Throughout this extensive literature, themes relevant to our study appear repeatedly. First, much older and weaker environmental movements—often stressing romanticized views of the environment as benign or threatening or seeing it as the locus of valued resources—took on massive force when supported by the world scientific enterprise that exploded after World War II and provided convincing and legitimate analyses of environmental destruction (Meyer, Frank, et al. 1997, 630–31; Drori et al. 2003, 263). This point is fundamental in the work of David Frank (1999, 535), who stresses the extraordinary transformation produced by the rise of scientific conceptions

of nature as an ecosystem. These conceptions made possible a universalized global movement built on highly legitimated analyses that were not plausible when rooted in aesthetic celebrations of the beauty of nature. The point is also fundamental in the parallel literature stressing the impact of particular scientific efforts—most notably that of Rachel Carson (1962).

This first core point leads to a second. The environment movement, as it expanded based on a scientific model, grew as a generalized social movement rather than an unintegrated mass of specialized concerns and problems. Certainly, there have been devotees of particular species (e.g., whales), particular dimensions of the environment (global warming, deforestation), particular threats (mercury poisoning), or particularly targeted areas (rain forests) or populations (impoverished groups exposed to exceptional pollutant levels). But to a striking extent, all these particular movements have been organized by their leaders and conceptualized by participants under very general environmental categories, legitimated by a general and scientific worldview. The rise of “the environment” as a cultural concern and basis of social organization is supported by a generally scientized view of the natural world (or “paradigm shift,” as in Catton and Dunlap 1980, 34; Dunlap et al. 1993). Thus the environment movement has tended to have a collective and cultural cast, rather than a local and narrowly instrumental one. That is, the “environment” has emerged as a taken-for-granted reality throughout the world. Thus, comparative studies show very widespread support for the movement, surprisingly independent of national cultural variations or the variable threats to which individuals and populations are exposed (Dunlap and Jones 2002; Ignatow 2007). The common research finding is that environmentalism is not much greater in especially threatened settings or much weaker in pristine ones (Dalton 2005; Frank et al. 2007, 296; Franzen and Meyer 2010; Longhofer and Schofer, 2010, 518).

Long-term and severe environmental damage has occurred around the world throughout history. But it is only recently that the negative effects of environmental exploitation have been framed as a global problem to be addressed by raising environmental consciousness worldwide. In a world in which all sorts of problems are imagined to have educational roots (ignorance) and educational solutions (enlightenment), environmental education has emerged as a preferred solution. Our main argument is that global environmentalism affects education as a generalized cultural frame. This argument has roots in sociological neoinstitutionalism but more broadly in classic perspectives that recognize that it matters how problems are framed (Snow and Benford 1992). Clearly, global environmentalism is a response to rising and risky environmental damage. But how environmental damage is conceived matters, and aided by scientific codification, a powerful global movement has generated a frame that now reaches into the intended educational curriculum.

### **The Rise of Environmental Education**

The environment, seen scientifically, became a generalized concern on a supranational and even global basis. It thus became reasonable—indeed, essential—to see the environment as a fundamental worldwide focus of education. In the same way that social movements have put forward universalized human rights as core to modern education (Tibbitts 1997; Ramirez et al. 2007, 39–40), and as central elements to the socialization of all young persons, advocates of environmentalism see the understanding of the environment and its problems as central to the education of everyone (Palmer 2003, 174). This viewpoint is commonplace in various international documents like the Declaration of the United Nations Conference on the Human Environment described below. A worldwide movement for environmental education, celebrated in global organization and discourse, is a natural consequence. It makes sense that universal principles be taught universally.

The self-conscious environmental education movement had many roots, expanding throughout the postwar period. Its educational dimensions expanded dramatically during the 1970s (Palmer 2003; see also Wheeler 1985, Sterling 1992, and Smyth 2006). The first major global event for environmental education was the UNESCO/International Union for the Conservation of Nature “International Working Meeting on Environmental Education in the School Curriculum” in 1970, which provided the classic definition of environmental education: “The process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture, and his biophysical surroundings” (Palmer 2003, 7).

Since 1970, environmental education has gained support from major global environmental organizations, both governmental and nongovernmental. In 1972 the world had its first major international conference on the environment in Stockholm, leading to the Declaration of the United Nations Conference on the Human Environment. Principle 19 of the declaration emphasizes the importance of environmental education, asserting that “Education in environmental matters . . . is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment” (United Nations 1972).

An emphasis on education as a key component of global environmentalism was reinforced in subsequent international meetings and the activities of intergovernmental organizations. Nongovernmental organizations also participated actively. As early as 1980, environmental NGOs such as the World Wildlife Fund (WWF) collaborated with these intergovernmental organizations (Palmer 2003, 15). And in 1992 at the UN Conference on Environment and Development in Rio de Janeiro, NGOs held a parallel global forum

attended by representatives from several hundred private voluntary organizations.

Throughout this period, notions of the environment, especially the person-environment relationship, and other related trends in education continued to evolve and shape the nascent field of environmental education. Joy Palmer (2003) identifies shifts from an emphasis on nature study and fieldwork in the 1960s to outdoor education, conservation education, and urban studies in the 1970s to global education and development education in the 1980s and, finally, to themes of empowerment, community, and sustainability in the 1990s and beyond. Starting in the 1970s, human rights education also became a central theme (Eide and Thee 1983; Ramirez et al. 2007; Meyer et al. 2010, 123). With the shift to notions of the human individual as an empowered actor, themes and rhetoric in environmental education moved away from passive approaches emphasizing factual knowledge, such as naming birds and trees, toward a more active pedagogy emphasizing, for example, making concrete lifestyle changes to reduce waste (Palmer 2003, 172).

## Theory

### *World Society Effects*

As we examine environmental discourse in our textbook data set, we drew our first hypothesis from the strong and global character of the environmental education movement. We expect to find general increases in environmental discourse. Further, working from a literature that shows the extent to which national educational systems reflect global patterns over and above distinctive national histories (Meyer and Ramirez 2000; Ramirez and Meyer 2002), we expect these changes can be found quite generally. It is difficult to distinguish the effects of global environmental movements from the effects of the environmental crises that these movements address because the two are closely correlated. But we can test the idea that strong educational impacts are at the global level:

**Proposition 1a:** At higher construal levels, subjective feelings of difficulty are interpreted as effort put forth in ensuring outcome desirability and thus increase choice confidence.

We assume, as noted below, that there are national variations in the adoption of textbook environmental discourse. But an important factor, commonly emphasized in empirical studies of national educational systems, is the degree to which a country is connected to the wider world society (and hence, world educational culture). Thus:

**Proposition 1b:** Linkages between national society and world society positively influence the use of environmental discourse in textbooks.

*Environmentalism as Postnational Ideology*

A second set of ideas reflects the role of environmentalism as a constitutive component of world society, as shown by Ulrich Beck's studies (2006, 2008) on environmentally rooted cosmopolitanism. We suppose that environmental education has become a way to teach the student that he/she is a person, with substantial rights and capacities, in a global society operating in a great natural world. Our view runs counter to doctrines that stress autonomous national society and the subordination of both nature and human diversity to the unified nation-state. Our line of argument reflects the point that the main themes of environmental education tend to be universal doctrines rather than reflections of immediate local circumstances. The environmental education teacher may lead the students in cleaning garbage out of the local creek, or testing the local water, but the principles at hand and the real lessons to be taught are universal in character. Thus:

**Proposition 2:** Environmentalism in textbooks reflects a general set of dimensions stressing the student's individual human membership in a naturally ordered global society.

Environmentalism reflects what William Catton and Riley Dunlap (1980) and Riley Dunlap et al. (1993) call a general paradigm rather than a specific set of interests. Thus environmentalism should be greater in textbooks that are:

- 2a) more student-centric;
- 2b) less attentive to (particularly national) history as opposed to civics or social studies;
- 2c) more international;
- 2d) more focused on broad human rights;
- 2e) more focused on the day-to-day issues of social life.

*Environmentalism as Contingent on Societal Development or National Culture and Problems*

The propositions above focus on the expansion of global society and its associated culture. However, classic theories of education in general and the curriculum in particular stress the importance of national economic and political factors as well as national cultural heritages. These classic theories are based on functionalist ideas about the close linkages between education and the immediate socioeconomic requirements or distinctive cultures of countries and their elites. This line of thought depicts national ecological, economic, political, and cultural factors as influencing educational outcomes. From this perspective one could imagine that more economically developed countries could afford to (or need to) include more environmental emphases while those struggling to develop may be less able or more reluctant to move in this direction (e.g., Inglehart and Baker 2000). Furthermore, it may be reasonable to assume that the more democratic countries are more open to environmental education emphases. Finally, a Western cultural heritage may



be more conducive to environmental emphases, since so much of the action on the environment initially had Western roots (Sauvé 1999, 19). Thus, it is important, in addition to considering the effect of global processes, to incorporate the classic theories stressing the distinctive properties of national societies that vary so dramatically around the world in resources and culture (e.g., Anderson-Levitt 2003; Schriewer and Martinez 2003):

**Proposition 3:** Environmentalism in textbooks reflects social, political, and economic centrality in modern world society, and is greatest in countries that are:

- 3a) more developed,
- 3b) Western, and
- 3c) more democratic.

A related idea would emphasize the causal role of the national development of specific environmental movements and policies in affecting environmental education, rather than development in general. Thus, views of the educational curriculum as strongly influenced by particular pressure groups would suggest that the strength of environmentalism in a particular country would drive curricular change:

**Proposition 4:** Environmentalism in textbooks reflects the strength of organizational commitments, in national states and societies, to environmental policies.

Finally, although our main focus is to explore the extent to which environmental emphases in textbooks are part of a global discourse and linked to other curricular changes, it is also worthwhile to consider the role of increasing levels of environmental damage, since, from a classic functionalist perspective, education adapts to address current and local problems:

**Proposition 5:** Greater environmental emphases in textbooks may be prompted by:

- 5a) increasing levels of global environmental damage, and
- 5b) greater national levels of environmental damage.

We approach the issues laid out here with empirical analyses from our textbook data. Note that, while different perspectives emphasize the importance of different variables, they do not directly confront one another, since they do not imply contradictory arguments. In principle, all or none of the factors identified in the propositions of interest may influence environmental discourse in textbooks.

#### **Data and Measures**

On a cross-national basis, the intended content of education has received little attention relative to studies of educational enrollment or achievement.

This is due in part to the reality that curricula are generally poorly monitored and recorded over time (see the essays in Benavot and Braslavsky 2007). Tracking curricular changes through looking at actual textbooks used in classrooms rather than general standards or frameworks poses an even greater challenge. The Georg Eckert Institute for International Textbook Research in Braunschweig, Germany, is the most outstanding source for textbooks. The institute has tried to systematically collect secondary education–level social studies textbooks—history, geography, civics, and social studies, particularly—from countries around the world. It was founded after World War II with the reformist aim of helping to move curricula away from the nationalist ideologies associated with the world wars. The library currently has a collection of over 60,000 social science textbooks from around the world, principally for the period since 1950.

As part of a research project on the expansion of human rights education worldwide, we gathered social studies textbook data by working with the helpful staff at the Eckert Institute library and by adding textbooks for additional countries supplied by supportive colleagues in other countries. Our final data set consists of 484 history, civics, and social studies textbooks from 65 countries for the period 1970–2008. Our main focus was on junior and senior secondary texts (roughly grades 6–12), and our original topical focus was on human rights education. We first selected books from countries with a minimum of two books per time period (one history and one civics or social studies text in each period) at the Eckert Institute. In the initial sample collected at the institute, European and North American countries were overrepresented. Thus, we began a second phase of selection aimed at gathering books from other regions by calling on colleagues to send books and by purchasing books directly from publishers. Appendix table A1, available in the online version of *Comparative Education Review*, provides a list of the countries covered by our data set and a count of the number of books in each period. Inevitably, our data set is imperfectly representative. On average, we have slightly more books per country for the West than for other countries (8.3 books per Western country, 7.7 books per Eastern European country, and 6.2 books per country in the rest of the world). The data have varying numbers of textbooks for countries and periods. To deal with this problem, we employ a hierarchical linear model in our analyses. This method helps us avoid artificially weighting countries from which we have more books.<sup>1</sup>

We coded each book (with translators) using a simple scheme designed to capture environmental emphases and other relevant variables such as human rights emphases and international orientation. The coding protocol is available in appendix B in the online version. The result is a unique data set that allows us to study worldwide changes since 1970 in social studies

<sup>1</sup> We thank Anthony Bryk for advice on this issue.

curricula. Despite our limitations in coverage of countries, texts, and curricular topics (e.g., we do not have science or geography texts), we cover many more books, countries, and time periods than any previous study, allowing us to make more comparisons than was previously possible.

## Measures

### *Dependent Variable*

Our outcome measure is a dichotomous indicator for whether a textbook has any mention of the environment.<sup>2</sup> In our definition, “environmental education” is broadly conceptualized to include teaching about the natural world, as well as more normative aspects of resource management, sustainable development, and environmental activism. We did not include pure geography or natural science books in our data set, as we initially gathered the data for other purposes than the analysis of environmental education. However, social studies texts (including history and civics) often have a section emphasizing the natural environment.

Figure 1 shows the table of contents for *Social Studies for Bahamian Secondary Schools* (Sealey and Curry 2006), an example of a textbook that discusses the environment. Nearly half the book’s contents, 5 out of 12 chapters, concern the natural world. The sections cover weather patterns, climate, and vegetation worldwide, as well as country-specific chapters on the climate and vegetation of the Bahamas.

In contrast to this example, most books in our sample contain no direct mention of the environment. For example, a social studies–type book for Ghanaian schools called *Life Skills for Junior Secondary Schools* focuses entirely on the tasks of daily life, such as preparing food, making clothes, cleanliness, and running a business (see fig. 2).

### *Independent Variables*

*Environmentalism in world society.*—To describe the global expansion of environmentalism, the focus of Proposition 1a, we characterize each year since 1970 by an index that adds together (a) the cumulative number of global environmental instruments created, ranging from zero to 12 (UNEP 2009) and (b) the total number of environmental international nongovernmental organizations (INGOs) worldwide from the Yearbook of International Organizations (Union of International Associations, 2005). Both variables are logged to correct for skewed distributions. In order to combine measures

<sup>2</sup> Initial coding used a scale ranging from zero to five, with a higher score indicating greater emphasis on the environment, as well as an additional indicator for whether the book mentions “environmental rights.” The distribution of responses in the scale, however, was sufficiently skewed to warrant concern, as 56 percent of textbooks have no mention of the environment. Thus, we employ a simple dichotomous indicator for “any mention of the environment” in our main analyses. Note though, that results using the ordered scale (available from the authors) do not change substantially from the models using a dichotomous indicator presented here.

## Contents

	Acknowledgements	iv
	Introduction	v
<b>Section 1</b>	<b>Religion</b>	
	1 Introduction to religion	2
<b>Section 2</b>	<b>History of The Bahamas</b>	
	2 The Eleutheran Adventurers and Proprietary Government	16
	3 Pirates and Crown Colony Government	23
	4 The Loyalists	30
	5 Slavery in The Bahamas	40
<b>Section 3</b>	<b>Bahamian society</b>	
	6 Social issues	54
	7 Bahamian culture	60
<b>Section 4</b>	<b>Weather and climate</b>	
	8 Weather	68
	9 Climate	82
	10 The climate of The Bahamas	99
<b>Section 5</b>	<b>Vegetation</b>	
	11 World vegetation	112
	12 The vegetation of The Bahamas	131
	Index	144

FIG. 1.—Social studies book (secondary school level) from the Bahamas showing environmental emphasis. Source: Sealey and Curry 2006.

that use different scales into an index, we calculated the *z*-score of each variable and took their sum, consistent with measures used to assess the global expansion of national human rights institutions (Koo and Ramirez 2009, 1333).

To show effects of variations in national linkage to world society (Proposition 1b), we employed a measure common in research on world society (Cole 2005, 483; Koo and Ramirez 2009, 1334), namely, the numbers of national memberships in INGOs, averaged over the 1970–2008 period of our study (Union of International Associations, 1970–2000). In addition, we used

	Preface	
	Acknowledgement	
Chapter 1	Individual development	1
Chapter 2	The food we eat	12
Chapter 3	The kitchen and kitchen equipment	21
Chapter 4	Food preparation	28
Chapter 5	Textiles in the home	36
Chapter 6	Learning to sew	47
Chapter 7	Surfaces in the home and cleansing agents	62
Chapter 8	Creative skills	72
Chapter 9	Business skills development	78
	Glossary	89

FIG. 2.—Social studies book (secondary school level) from Ghana showing no environmental emphasis. Source: Adow et al. 1988.

these nations' memberships in INGOs devoted to environmental matters.<sup>3</sup> Both variables are logged to correct for skewed distributions.

*Postnational curricular emphases.*—We used several indicators of textbook shifts in focus away from the national state toward emphases on both the individual person and a wider and more diverse world. This is the focus of Proposition 2. Books are characterized by:

An eight-item index of their appeal to student interests (Bromley et al. 2009, table 1);<sup>4</sup>

A dichotomous item: whether the book is a civics/social studies versus a history text;

<sup>3</sup> Specifically, this measure is the number of ties to 25 environmental INGOs randomly sampled from the population of environmental INGOs in 2005. We thank David Frank for assisting us with this measure.

<sup>4</sup> The eight items in this index are: (a) presence (and frequency) of pictures, especially those likely to interest students (e.g., pictures of ordinary persons, or of young people) (0–3 scale); (b) presence and extent of any assignments for students (0–2 scale); (c) presence and extent of active project activities for students (0–2 scale); (d) presence and extent of role-playing exercises (0–2 scale); (e) extent to which questions for students are open-ended, legitimating the student's own opinions and choices, without right-wrong answers (0–3 scale); and (f) extent to which the book is laid out in an "expanding environment" style, working from child to community to society (0–3 scale). Books were also coded on (g) the extent to which children are discussed in the text (scored 0–5), and (h) whether there are mentions of children's rights (coded 0–1).

A single five-point item characterizing books by the extent of their international focus;<sup>5</sup>

A four-item index of the book's emphasis on human rights (Meyer et al. 2010, 123);<sup>6</sup>

A single item characterizing a book by whether it discusses social issues or problems students may deal with such as money, dating, or interpersonal conflicts.

We considered these items entered individually into a model, and then as a single index of postnational curricular emphases created by summing the *z*-scores of the five measures. Combining the items in this way allows us to create an index where each item is given equal weight although the scales of the initial five items vary. The postnational index ranges from  $-5.55$  to  $9.01$ , with a mean of  $-0.07$ .

*Development.*—We characterize countries by their gross domestic product per capita (log) from the World Development Indicators (World Bank 2008) and by scores on political democracy (Marshall and Jaggers 2009), both averaged over the 1970–2008 period of our study. These are conventional measures in cross-national studies, which we use to explore Proposition 3. Additionally, we examine a dichotomous indicator for whether a country is Western in cultural heritage (i.e., Western Europe, the United States, Canada, Australia, or New Zealand).

*National environmentalism index.*—To assess the impact of national commitment to environmentalism in a country, we build an index by summing the *z*-scores of three variables: (a) A dichotomous indicator for whether a country has a Green Party (Global Greens 2009), (b) the age of a country's environmental ministry in 2008 (Frank et al. 2000), and (c) the cumulative number of international environmental treaties a country has signed by 2008 (UNEP 2009). This index of national environmentalism is used to explore Proposition 4.

*Indices for national and global environmental damage.*—To assess national environmental damage, the focus of Proposition 5a, we report the results of a country's "ecological footprint," which is a measure of the consumption of renewable natural resources (UNEP 2009). At the national level, this is a measure of the total area of productive land or sea required to produce all

<sup>5</sup> The question asks, "Are (non-security) international organizations mentioned? For example, G-8, World Economic Forum, the International Labor Organization, the World Trade Organization, the United Nations. Select highest that applies." The five-point scale is 0 = no, 1 = five or less, 2 = 6–10, 3 = 11–19, and 4 = over 20.

<sup>6</sup> The four items in the human rights index are: (a) the amount explicit discussion of human rights (0–5 scale, zero being no discussion and five being over half the book); (b) the number of international human rights documents mentioned (e.g., United Nations Charter, Convention on the Rights of the Child); (c) reference to any national human rights documents or national governmental bodies (e.g., the Declaration of the Rights of Man or an Ombudsman's Office for Human Rights); and (d) discussion of any major human rights disaster (e.g., the Holocaust), conceived in human rights terms rather than simply as a great historical tragedy.

the crops, meat, seafood, wood, and fiber that a population consumes to sustain its energy consumption and to make space for its infrastructure. We use a country's score for 2001, the year for which we found information for the greatest number of countries. As an additional check, we examine a time-varying national level indicator of environmental damage that measures paper and paperboard consumption (World Resources Institute 2010). Note that the environmental footprint measure is used as a measure of environmental damage in the hierarchical logistic models, which require fixed country characteristics, as described below. The paper and paperboard consumption model is used in subsequent logistic regression analysis (see table D1 in the online appendix) to examine the robustness of our results if country-level predictors vary over time.

A challenge we face is that most indicators of environmental damage are too closely linked to measures of development and industrialization to distinguish their effects—and both measures are also highly correlated with INGO memberships. For example, in our sample the ecological footprint measure is correlated at the 0.80 level or higher with gross domestic product (GDP) per capita (log), with a dichotomous indicator for Western countries, and with another measure of environmental damage measuring carbon dioxide emissions per capita. Thus, in our analyses we limit the number of highly correlated variables in our models by entering variables singly before showing a full model.

We further measure environmental damage using a global index to capture change over the period of our study, the focus of Proposition 5b. This measure is constructed from annual global carbon dioxide emissions and annual global paper and paperboard consumption, using the sum of each variable's *z*-scores (World Resources Institute 2010).<sup>7</sup>

*Additional controls and robustness checks.*—We describe a book by its length in pages, as a control. And we distinguish whether it is aimed at the junior or senior secondary school level (i.e., grades 6–10 or grades 11–13). We also tested a control for whether the book is published by the government (vs. by a private company) as the best measure we could find of national control over curricula. At the country level, a descriptive examination revealed that countries in the sample are significantly wealthier and more democratic than those excluded, and they likely differ on other characteristics as well. As an attempt to deal with this issue, we generated a nonselection hazard variable and included it as a control at the country level in analyses, but found that it is never significant and does not alter the findings. So it is excluded from the final results. Finally, we characterize countries by their location in a world typology in order to ascertain whether environmentalism in textbooks is more

<sup>7</sup> We thank Evan Schofer for advice on constructing this variable. Paper and paperboard consumption was used because it correlates highly with other indicators of environmental damage but is recorded better over time for a greater number of countries.

TABLE 1  
DESCRIPTIVE STATISTICS FOR TEXTBOOK AND COUNTRY VARIABLES IN HIERARCHICAL  
LOGISTIC REGRESSION ANALYSES

	Mean	SD	Minimum	Maximum
Book-level variables ( $N = 484$ ):				
Any discussion of environment	.44	.50	.00	1.00
Publication date	1994.55	9.97	1970	2008
Global environmentalism index	.14	1.98	-.33	2.03
Global environmental damage index	.77	1.76	-3.21	2.98
Student centrism index	1.16	.63	.00	2.94
Social studies/civics	.58	.49	.00	1.00
Internationalization	1.02	.98	.00	4.00
Human rights index	1.22	1.37	.00	4.89
Social science issues addressed	.22	.41	.00	1.00
Postnational index	-.07	3.08	-.55	9.01
Pages	245.58	124.32	25.00	880.00
High grade (11–13)	.25	.43	.00	1.00
Country-level variables ( $N = 65$ ):				
GDP/capita (constant USD, average over study)	8,454.45	9,493.41	104.66	40,972.91
Eastern Europe	.23	.42	.00	1.00
Western Europe and North America	.29	.46	.00	1.00
National environmentalism index	-.28	1.97	-.43	4.36
INGO memberships (average over study)	1,044.03	668.87	76.53	2,769.47
National environmental damage	3.21	2.06	.60	9.50

NOTE.—SD = standard deviation; USD = U.S. dollar.

likely in some regions and cultural settings than others. The descriptive statistics for our dependent and independent variables are shown in table 1.

While our choice of hierarchical modeling has the benefit of accurately reflecting the nesting of textbooks within countries, as described below, a limitation of this approach is that country characteristics must be fixed. Clearly, over the period of our study some indicators, such as GDP/capita, level of democracy, and/or environmental damage, may have changed substantially. As an effort to consider whether variation over time in country-level indicators indicate substantially different results, we also conduct a logistic regression analysis using country averages in three time periods. The results, available in available in table D1 in the online version, largely replicate the central findings reported below and thus do not indicate cause for concern.

### Analysis Model

We first present a descriptive analysis of changes in means and percentages of our core variables over time and then shift to a hierarchical generalized linear model (HGLM; Raudenbush and Bryk 2002). Hierarchical models are appropriate because textbooks are clustered by country, as table A1, available online, describes. Also, we hypothesize that the level of environmentalism in textbooks is influenced by both textbook-level and country-level variables. Modeling the outcome as a product only of textbook-level variables using ordinary least squares (OLS) regression would underestimate



the error that arises from the commonalities of textbooks within particular countries, violating the assumptions of OLS regression and perhaps creating artificially significant results. Furthermore, the data contain varying numbers of textbooks by country and over time, a problem for OLS models but adequately handled by hierarchical models. Hierarchical models incorporate both textbook-level and country-level errors and allow us to use the full range of available information (Raudenbush and Bryk 2002).

Our hierarchical model consists of a textbook level (level 1) equation and a country-level (level 2) equation. The outcome is a binary variable, so we use a binomial sampling model and a logit link function, similar to logistic regression. The constant of the textbook-level equation is modeled as a function of country characteristics; therefore the interpretation of the constant is of utmost importance. We grand mean center all textbook-level and country-level predictors except the dichotomous indicator for Eastern Europe. Thus, in models without an indicator for Eastern Europe,  $\beta_0$  is the predicted log odds for any country  $j$  after adjusting for differences in the predictor variables. In models with an indicator for Eastern Europe,  $\beta_0$  is the predicted log odds of mentioning the environment for a textbook in non-Eastern European country  $j$  after adjusting for differences in the predictor variables. For ease of interpretation, we present odds ratios (or the exponentiated coefficients) rather than the direct coefficients. The odds ratios can be interpreted as the change in odds of a textbook containing a discussion of the environment for a one unit change in the independent variable.

Sample equations for our full model (table 3, model 8) are:

$$\begin{aligned} \log [\Phi_{ij}/(1 - \Phi_{ij})] = & \beta_0 + \beta_1(\text{global environmentalism index}) \\ & + \beta_2(\text{postnational index}) \\ & + \beta_3(\text{number of pages, log}) \\ & + \beta l(\text{grade level}) \end{aligned} \quad (1)$$

$$\begin{aligned} \beta_0 = & \gamma_{00} + \gamma_{01}(\log \text{GDP/capita}) \\ & + \gamma_{02}(\text{Eastern Europe}) \\ & + \gamma_{03}(\log \text{INGO memberships}) \\ & + \gamma_{04}(\text{national environmentalism index}) \\ & + \gamma_{05}(\text{national environmental damage}) + \mu_{0j}. \end{aligned} \quad (2)$$

## Results

Table 2 reports changes over time in the basic variables central to our examination of the textbooks. We split our sample into three periods, 1970–

TABLE 2  
CHANGES OVER TIME IN TEXTBOOK ENVIRONMENTAL COVERAGE

	1970–84 ( <i>n</i> = 95)	1985–94 ( <i>n</i> = 142) <sup>a</sup>	1995–2008 ( <i>n</i> = 247) <sup>b</sup>
A. Proportions with any discussion of the environment	.242	.437**	.518 <sup>+</sup>
B. Proportions discussing environment by country cluster:			
West <sup>c</sup>	.362	.574*	.517
Eastern Europe <sup>d</sup>	.103	.194	.293
Other	.158	.439*	.618*
C. Proportions discussing environment by specific subject: <sup>e</sup>			
Social studies/civics	.313	.514*	.635*
History <sup>f</sup>	.170	.357*	.307
D. Core textbook-level indicators:			
Mean score on student centrism index	.764	1.009**	1.407***
Percent social studies or civics	.505	.507	.644**
Mean level of internationalization	.863	.986	1.093
Mean score on human rights index	.828	.842	1.585***
Percent mentioning social science issues	.105	.190*	.279*
Mean score on postnational index	-.560	-.829*	.948***

NOTE.—All significance tests are one-tailed.

<sup>a</sup> Significance indicates *t*-test comparing difference between periods 1 and 2.

<sup>b</sup> Significance indicates *t*-test comparing difference between periods 2 and 3.

<sup>c</sup> Number of books in country clusters per period is as follows: West (47, 54, 58), Eastern Europe (29, 31, 58), and Other (19, 57, 131).

<sup>d</sup> The difference between the first and third period in Eastern Europe is significant.

<sup>e</sup> Number of books in subjects per period is as follows: social studies/civics (48, 72, 159), and history (47, 70, 88).

<sup>f</sup> The difference between the first and third periods for Eastern Europe, for history texts, and in mean level of internationalization is also significant, although our table does not allow us to indicate these increases.

<sup>+</sup> *P* < .10.

\* *P* < .05.

\*\* *P* < .01.

\*\*\* *P* < .001.

84, 1985–94, and 1995–2008, based on substantive and methodological grounds. The period 1995–2008 is designed to capture potential changes following the collapse of communism as a global ideology, and the period 1970–84 is intended to describe the early period of our study.<sup>8</sup> We do not have sufficient numbers of books to perform significance tests using more fine-grained intervals such as 5 or 10 years, but the basic trends of increase over time are consistent regardless of how we split the sample. The first section of table 2 tests our first hypothesis. The data show an increased emphasis on the environment in textbooks over the 38 years of our study. Note that the proportion of textbooks that discuss the environment in the period since 1995 is roughly double the level in the earlier 1970–84 period, with the percentage of books that discuss the environment increasing from 24 to 52 percent. There has been substantial growth in environmental emphases in textbooks since 1970.

The second and third sections of table 2 shows that significant increases are quite general across varied country clusters (section B) and subjects

<sup>8</sup> Our country-level independent variables, however, are mostly averages over the whole period of study, because the particular HGLM models available to us did not permit over time variation. We checked in several ways to test whether this distorted our analyses, and concluded it did not.

(section C). The difference between the first and third periods in Eastern Europe is also significant, although our table does not allow for reporting this increase. There are also obvious variations among these regions (e.g., overall lower levels of environmentalism in Eastern Europe; higher levels in the West, especially earlier on, and in other regions, especially since 1995). For non-Western, non-Eastern European country clusters (e.g., East Asia or the Middle East) our sample lacked sufficient coverage over time to permit a more detailed breakdown and interpretation. Section C shows that the increase occurs in both history and social studies/civics textbooks and that a greater proportion of social studies/civics books than history books in our sample discuss the environment.

Section D shows quite consistent changes in each of our five indicators of textbook “postnationalism.” Student-centrism and human rights emphases increase, as is noted in other studies (Bromley et al. 2009; Meyer et al. 2010). International focus also increases, though the rise is only significant between the first and third periods in our study. Social issues and problems come up more frequently.

Table 3 reports the results of our hierarchical linear model analyses. Throughout these analyses, we control for the number of pages (logged) in a book and for books at the upper secondary level. Grade level has no effect, and book length has a positive association with environmentalism, but these controls do not alter the influence of our core variables of interest. Estimates for these coefficients are available from the authors.

We begin in model 1 with a substantive variable—our global environmentalism index—which directly captures the changed world conditions we posit in Proposition 1a. Because we know that the global environmental movement has grown over time, it is unsurprising that this variable has an extremely high correlation with publication date (0.965) and cannot be included in the same model with date. As indicated in table 2, books published more recently presumably reflecting changed world emphases, give more attention to the environment. Despite the high correlation with time, in models unreported here we observed that global environmentalism shows an even more significant association with discussions of the environment in textbooks than a simple linear variable for a book’s publication date. The global environmentalism index retains its positive relationship with environmental emphases throughout the analyses, diminishing slightly in significance and magnitude in models 2–7, which contain relevant mediating variables. Thus, we find strong empirical support for a worldwide trend in the direction of greater environmental emphasis and for global influence on the level of environmental emphasis in textbooks. Note that increases in global environmentalism over this period are closely linked to higher levels of global environmental damage, a point to which we return later.

In models 2 and 3 we estimate the influence of other textbook charac-

TABLE 3  
HIERARCHICAL LOGISTIC REGRESSION ANALYSES FOR ANY DISCUSSION OF THE ENVIRONMENT IN  
TEXTBOOKS WITH GLOBAL ENVIRONMENTALISM INDEX

	Odds Ratio								
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Book-level variables:									
Global environmentalism index	1.257**	1.104 <sup>+</sup>	1.109 <sup>+</sup>	1.135*	1.152*	1.107 <sup>+</sup>	1.133*	1.128 <sup>+</sup>	...
Global environmental damage index	...	...	...	...	...	...	...	...	1.125 <sup>+</sup>
Student centrism index	...	2.017**	...	...	...	...	...	...	...
Social studies/civics	...	2.017*	...	...	...	...	...	...	...
Internationalization	...	1.572**	...	...	...	...	...	...	...
Human rights index	...	1.118	...	...	...	...	...	...	...
Social science issues addressed	...	3.014**	...	...	...	...	...	...	...
Postnational index	...	...	1.425***	1.407***	1.408***	1.420***	1.419***	1.411***	1.413***
Intercept	.791 <sup>+</sup>	.776 <sup>+</sup>	.768 <sup>+</sup>	.895	.722*	.728*	.745*	.890	.910
Country-level variables:									
GDP/capita (log)	...	...	...	1.197 <sup>+</sup>	...	...	...	1.193	1.209
Eastern Europe	...	...	...	.436**	...	...	...	.444*	.424*
INGO memberships (log)	...	...	...	...	1.522*	...	...	.927	.892
National environmentalism index	...	...	...	...	...	1.195*	...	1.046	1.044
National environmental damage	...	...	...	...	...	...	1.145 <sup>+</sup>	1.004	1.005

NOTE.—GDP = gross domestic product; INGO = international nongovernmental organization. All significance tests are one-tailed. The odds ratio is the exponentiated coefficient from the hierarchical logistic regression model; we report robust standard errors in parentheses. *N* at level 1 is 484 and 65 at level 2. All continuous book-level and country-level variables are grand mean centered. Models also include controls for book length (log number of pages) and grade level (dichotomous variable for grades 11–13). Grade level is never significant, and models 2–7 indicate that longer books are more likely to discuss the environment.

<sup>+</sup> *P* < .10.

\* *P* < .05.

\*\* *P* < .01.

\*\*\* *P* < .001.

teristics on the likelihood of finding any environmental discourse, our argument in Proposition 2. In these models, each book is characterized by five indicators of what we call “postnationalism”—a focus on the student, on social issues, on human rights, and on international society, and less emphasis on national history. Each of the five indicators (and the index assembling them in model 3) shows a positive independent association with the level of environmentalism in the textbooks. Rather than a response to a specific environmental issue, environmental education seems to reflect a more general cultural change or “paradigm shift” (Catton and Dunlap 1980; Dunlap et al. 1993). The analyses are presented as typically causal models, but it is just as useful to think of them as reporting a set of associations among variables that in modern world culture have linked meanings. The environment appears to be part of a package of ideas, including a view of both supra- and subnational human society as analyzable in universalistic social scientific more than historically specific terms.

Model 4 introduces the most common indicator of national development—log GDP per capita, specifying our Proposition 3a about the effect of development. This variable initially shows a positive association with environmentalism, but this relationship disappears after controlling for other country variables in our final models. The related indicators of Western status (Proposition 3b) or democratization (Proposition 3c), considered in analyses not reported in table 2, do not show a significant additional association with discussions of the environment in any of our analyses once the basic indicator of economic development is introduced.<sup>9</sup> In model 4, we also add a control for books from Eastern European countries.<sup>10</sup> Throughout the period covered by our data set—both before and after the breakdown of communism—these countries show lower levels of environmentalism, as indicated in table 2. Their emphasis on material production as a central goal of development clearly undercuts environmental concerns (Yanitsky 1999, 160–61).

Models 5–7 introduce three country-level variables. Model 5 shows that the commonly used indicator of national linkages to world society—log INGO memberships—has the expected positive association with textbook environmentalism, as suggested in our Proposition 1b. But this relationship appears

<sup>9</sup> A country's democracy score had no significant association with environmental emphases even when entered alone, while an indicator for Western countries had a marginally positive significant association (at the 0.1 level) until controlling for either GDP/capita (log) or a dummy for Eastern Europe. We tested additional national measures from the World Development Indicators (World Bank 2008) for expansion of the secondary and tertiary education system, the proportion of women in the labor force, aid per capita, and the extent of international tourism. None of these measures had a significant effect.

<sup>10</sup> We also examined a more fine-grained regional comparison of Eastern Europe, Latin America and the Caribbean, the Middle East and North Africa, East Asia, and sub-Saharan Africa versus a reference category of Western Europe, North America, Australia and New Zealand. The Eastern Europe effect is the only consistent trend, although in some models Latin America and the Caribbean had marginally higher scores than the West, and sometimes the Middle East and North Africa had marginally lower scores.

statistically insignificant once other national factors are controlled. We observe the same pattern using a measure of environmental INGO memberships. This is a somewhat surprising finding, given empirical studies that show the importance of INGOs, but it may well be that curricular environmentalism has become both less controversial and very much a feature of an overall curricular shift. An earlier article considering the association between INGOs and human rights emphases in textbooks found a similarly modest association (Meyer et al. 2010).

Model 6, reflecting our fourth proposition about nation-level mobilization, reveals a positive relationship between our national environmentalism index and environmental emphases in textbooks. But this association also appears insignificant once controlling for other country-level factors. Environmental concerns in the curriculum appear to reflect broader meanings than those captured by the national environmental movement itself. These concerns appear to be less tightly linked to the national context and national problems *per se*.

Proposition 5b was that national environmental degradation in a country influences the level of environmental emphases in textbooks. In model 7 we consider a measure of national environmental damage. In fact, the estimates for model 7 confirm there is a statistically significant positive effect of national damage. However, as was also found for the other country variables (aside from Eastern Europe) the effect of national damage appears insignificant if it is estimated simultaneously with the other country-level variables.<sup>11</sup>

Why do these national-level variables lose significance when they are estimated jointly, despite their significant positive effects when entered separately? As mentioned previously, there is a high correlation between measures of economic development, national environmental degradation, national environmentalism, and linkage to world culture through INGO memberships (pairwise correlations range from 0.45 to 0.81).<sup>12</sup> In a full model

<sup>11</sup> We also tested measures of carbon dioxide emissions, population density, the number of threatened species (all from UNEP 2009), as well as the number of vehicles per 1,000 people, health expenditures as a proportion of GDP, life expectancy, the infant mortality rate of children less than five per 1,000 births, and agricultural expenditures as a proportion of GDP (from the World Development Indicators 2010). The majority of these were not significant even before controlling for GDP/capita but generally operated in the direction that indicators related to economic development had a positive coefficient and indicators of low development (infant mortality) had a negative coefficient. None was significant after controlling for GDP/capita.

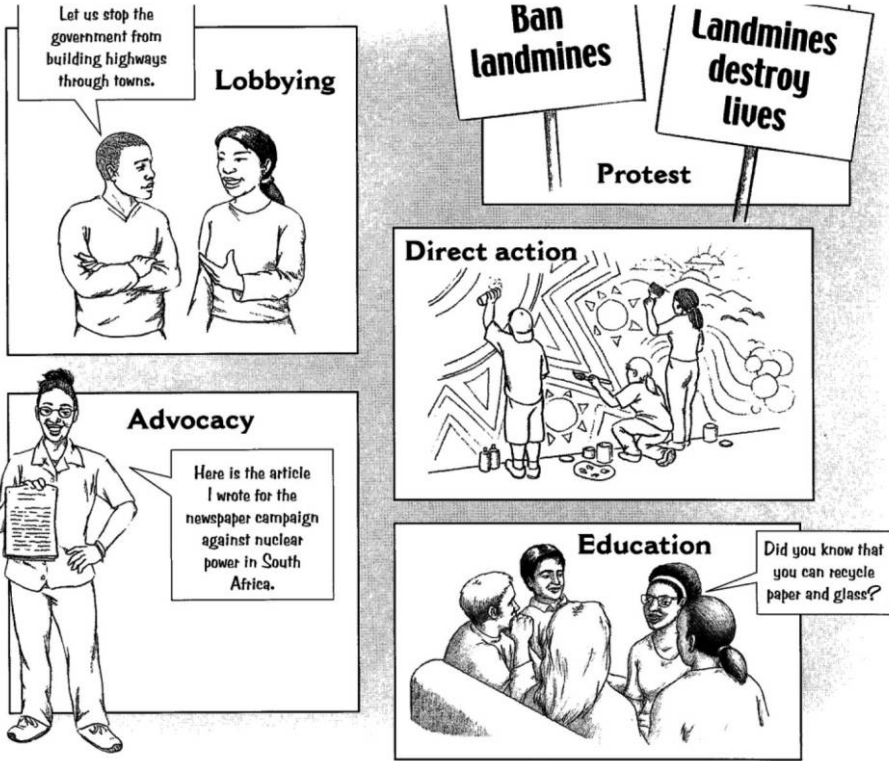
<sup>12</sup> Because of the requirements of HGLM modeling, national-level variables are represented by a single estimate of an average over the period of our study. To see whether time-varying measures of national environmental damage, economic development and linkage to world culture might show substantially different effects, we replicated our core analysis with simple logistic regression (see table D1 in the online appendix). Our core finding of the linkage of environmental discourse to other post-national characteristics of textbooks was strongly confirmed regardless of whether country characteristics vary over time, and a positive association with global environmentalism is generally significant. But in these analyses a time-varying measure of national environmental damage showed a marginally significant effect, and the effect of INGO memberships varies in direction and significance. These measures are, of course, closely associated with national development (correlations between the three variables are all over 0.73), so results must be interpreted with care.

(model 8), only the negative association between Eastern Europe and environmentalism remains significant. We interpret this as an indication that the high correlation between these variables makes it impossible for regression models to disentangle the marginal association of each predictor with discussions of the environment in textbooks.

We return now to a point mentioned earlier, that environmental emphases in textbooks may also be on the rise globally due to an increase in global environmental damage (Proposition 5a). To examine this issue in model 9 we replicate our full model using an indicator of global environmental damage rather than global environmentalism and find a large degree of similarity between models 8 and 9, unsurprising as global environmental damage is highly correlated (over 0.95) with time and global environmentalism. We would interpret this to mean that it is not global damage itself that directly prompts textbook authors to discuss the environment. Rather, textbook content is produced by the global movement of individuals, professionals, and educators who are concerned about this damage to the natural world and who therefore work to incorporate environmental education into textbooks. Certainly, the emergence of this movement is prompted by increasing global environmental damage, but environmental activism extends beyond those directly experiencing the worst forms of environmental destruction. Further, our central argument regarding environmentalism as linked to postnational characteristics of textbooks remains clear. Even after accounting for global environmental damage, environmental emphases in textbooks are linked to the broader curricular shifts.

*Postnational environmental emphasis.*—A few examples illustrate the interwoven nature of environmental emphases in textbooks and broad postnational culture. In a 2008 South African social studies text called *Life Orientation Grade 10*, the environmental emphasis is subsumed under a section on citizenship education. One-quarter of the citizenship education is dedicated to global environmentalism in subheadings called “Caring for the Environment” and “Our Threatened Earth.” Rather than emphasizing problems in South Africa, the section on the environment starts by saying, “People everywhere in the world today are becoming more and more aware of the fact that if we do not look after our planet, Earth, then we will soon run out of clean water, clean air and ground in which to grow our food” and showing students an image with the famous “Think Globally, Act Locally” slogan (Potenza et al. 2002, 124). Figure 3 shows that this vision of environmental education is explicitly linked to active citizenship through lobbying, protest, advocacy, direct action, and education.

A second example illustrates an approach that uses more scientific discourse than the activist South African orientation. *Jamaicans Working Together* is a social studies text for grade 8 published in 2008. Four chapters out of 10 discuss the physical environment and Jamaica’s relationship to it through



### Activity 27: Working in your environment

1. Brainstorm about any organisations or groups that you know in your school or your community that are taking care of some of the needs in your environment, such as dealing with litter, saving water, pollution from factories, dealing with sick and stray animals or growing trees.
2. Decide which of these organisations you would like to work with – either to help them do what they are already doing or to suggest something new that they could begin to do to achieve their goals.
3. Work with them for two to three months.
4. During this time, keep written records of what you are doing.
5. Evaluate the success of your work and share this with the organisation when you leave (you may stay on after three months if you would like to).

#### New word

**lobbying** means trying to convince governments, companies or households to do things differently.

Assessment criteria for this activity include your response to the topic, that you have worked with your chosen organisation for the prescribed period, you have kept written records of the work you have done, you have worked effectively as a group, you have a well presented project and that you have put in time and effort.

FIG. 3.—Postnational environmental emphases; social studies book for grade 10 from South Africa. Source: Potenza et al. 2002, 125.



farming, fishing, mining, and manufacturing. The book has a strong emphasis on conservation, labeling most of the environment chapters “Using our Resources Wisely.” It depicts the environment globally, as illustrated in figure 4, with a relatively technical illustration of global warming and discussions of how climate change will contribute to droughts, floods, and hurricanes. The environment is depicted as a global, rather than national, issue, and ordinary Jamaican schoolchildren are taught to understand scientific environmental problems globally and work to conserve environmental resources locally. Additional examples showing the various ways textbooks from around the world discuss the environment may be found in appendix C in the online version.

While education about national environmental concerns remains in these texts, the environment is also now linked to global issues of human rights and the right to a clean world, and environmental problems are more broadly recognized as inherently transnational. This parallels a general trend toward the expansion of the environmental movement into social, civic, political, and cultural realms of life (Smith and Pangsapa 2008).

#### **Directions for Further Study and Conclusion**

We report on a unique data set that covers social studies textbooks from countries around the world over recent decades. In our research we aimed to describe and analyze the expansion of concern with the environment in curricula around the world. We find an increase in environmental attention in the books that reflects the rise of an environmental focus (closely related to expanding environmental damage) around the world.

We further find that environmental emphases in the books are directly related to other postnational educational emphases. Environment-oriented books are about social issues and social studies (rather than history). They tend to have an international rather than national emphasis. They emphasize human rights, over and above national citizenship. They are student centered, seeking to interest and involve the student as an active agent in education, rather than showing more traditional pedagogical emphases.

Environmentalism reflects a paradigm change broader than the immediate influences of specific actors pursuing their distinctive interests. The paradigm shift extends far beyond environmentalism itself. It reflects a changed picture of the person, valorized as in the human rights movement (Meyer et al. 2010) and empowered as in the rise of student-centered pedagogies (Bromley et al. 2009). It also reflects a changed and globalized picture of society, as in the shift away from national history teaching (Wong 1991).

Environmental education is far from the hopes of some of its most radical protagonists, who advocated schooling that would mobilize environmentalism as a social movement. Environmental education may have mobilizational consequences, although whether advocacy ought to be a goal of environ-

## Global warming

Scientists are now predicting that there will be more frequent and powerful hurricanes in coming years because of a gradual rise in temperatures around the world, known as **global warming**. These powerful hurricanes will cause more floods and landslides in Jamaica and other parts of the Caribbean region. Global warming will also cause more severe droughts in the dry season. Global warming is a worldwide problem or concern to people in Europe, Asia, Africa, the Americas and the Caribbean.

Many scientists believe that global warming has been caused, or at least is being made worse, by human activities. When we burn **fossil fuels** such as oil, gas or coal, we create large quantities of the gas carbon dioxide. Carbon dioxide is perfectly safe – it is a natural part of what we breathe out or **exhale** – but scientists believe that large quantities of the gas build up, high in the atmosphere, and create a kind of blanket that wraps round the Earth and traps the warmth of the sun. This is called the **greenhouse effect**. This 'blanket' is gradually making temperatures on the Earth's surface higher, causing global warming. This is the reason why everyone is being encouraged to use cleaner energy sources such as solar power, wind power and hydro-electricity, which will not release carbon dioxide into the atmosphere.

► Why do you think these are called *cleaner* energy sources?

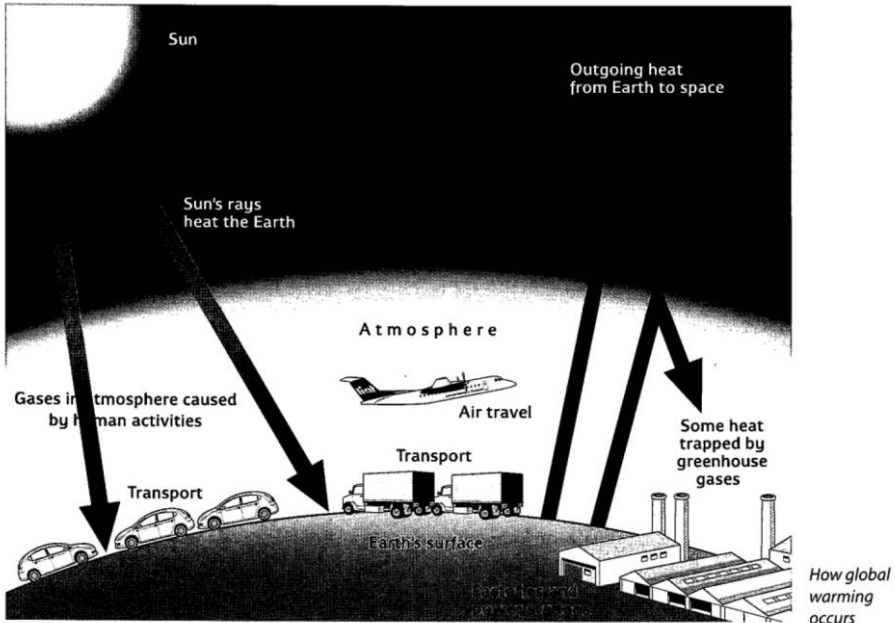


FIG. 4.—Postnational environmental emphases, social studies book for secondary schools from Jamaica. Source: Allen-Vassell and Fraser 2008, 40.

mental education is debated (Jickling 1993). But in our data environmental education takes the style of legitimated curriculum, radical but in a different way than activists might expect. It addresses a world ecosystem as a whole, not any particular environmental damage or crisis. And, it does so with a changed and postnational conception of humans in a world society embedded in a natural world, in contrast to citizens of a nation-state. In important respects, thus, environmental education reflects a stateless world society in which naturally empowered humans associate sustainably in conformity with the laws of nature. Thus, worldwide, environmentalism tends to become one more dimension stressing continually expanding human empowerment in dealing with a global problem, not a special call to action on particular issues. In this sense, the rise of environmental discourse is one more step in the broad history of modern education, emphasizing the cultural expansion of modern education itself rather than a directly oppositional approach to current realities.

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