Chapter 3
Education for Sustainability in the K-12 Educational System of the United States

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Introduction

Sustainability is a newcomer to the American school system. Although it is rooted in a century of environmentalism and conservation, it has yet to find a comfortable place among the established traditions of curriculum and pedagogy. This chapter offers one account of where it came from and how it has begun to influence teaching and learning in American schools. This chapter focuses on the educational system *as a system* and seeks to provide an essential context that will enable readers to understand current directions in education research, policy, and practice.

The United States faces imposing sustainability challenges. As one of the largest economies in the world, it relies on an outdated energy and transportation infrastructure. It is also the largest per capita emitter of carbon dioxide as well as the largest per capita producer of municipal and nuclear waste. And though the United States is among the oldest continuously operating democracies in the world, it is characterized by a persistent income inequality far larger than that of most other wealthy nations. If sustainability is a struggle waged on three fronts—environmental conservation, economic prosperity, and social equity—then the United States faces challenges on every side. Education has the potential to play an important role in meeting these challenges by fostering innovation, changing behavior, and shifting political discourse in the direction of sustainability. Much of this potential has yet to be realized.

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R. McKeown and V. Nolet (eds.), *Schooling for Sustainable Development in Canada and the United States*, Schooling for Sustainable Development 4,
DOI 10.1007/978-94-007-4273-4_3,

In this chapter, we use the phrase "education for sustainability" (EfS) rather than education for sustainable development (ESD). There is still no consensus about what we should call our field, but educators in the United States have slowly gravitated toward EfS. Many practitioners of EfS also identify strongly with the older tradition of environmental education (EE). The relationship between EE and EfS is complex. We do not think they are identical, but we also do not believe that a neat line can be drawn between them. Some authors have attempted to clarify the differences (e.g., McKeown & Hopkins, 2003), yet both fields encompass a broad range of ideologies and practices, and both are evolving, making it difficult to say what is typical for either. Despite their differences, though, there is no other educational movement in the United States that is more closely aligned with EfS than EE. Programs developed under the banner of EE have contributed enormously to programs now called EfS. Similarly, initiatives that support EfS also tend to benefit EE, and funding agencies make no clear distinction between the two fields. EE and EfS practitioners are likely to share resources and pedagogies and, in many cases, may not even see themselves as distinct groups. Finally, EfS is still a very young research field in comparison with EE. For all of these reasons, this chapter focuses a great deal of attention on EE research and practice. When we discuss these programs, we refer to them as EE, but we hope our readers will see the connections to EfS in the programs we highlight.

Our account is tightly constrained. We focus on educational programs that are closely associated with formal schooling and limit ourselves to what is generally referred to in the United States as K-12 education—shorthand for "kindergarten through twelfth grade," the education that students receive from about 5 to 18 years of age. We do not discuss the vast territory of learning outside of schools nor do we analyze higher education. We devote some space to vocational and technical education, a sector of education that is of growing importance to education for sustainability in the United States. We also briefly refer to problems in teacher professional development. A more concerted focus on teacher education is provided in Chap. 4.

The Changing System

EfS in the United States is growing slowly but steadily. Its growth has been shaped by environmental regulatory agencies at the federal level, educational regulatory agencies at the state and local level, and nongovernmental organizations (NGOs). Federal agencies have typically played a background role, supporting EfS-related practitioner networks and providing modest resources for new EfS-related projects. State and local agencies have played an enabling role, usually by releasing school- and district-level leaders from administrative constraints. Only a few states have taken a more proactive role by adopting curriculum and teacher education standards that are directly relevant to EfS. NGOs have exerted the most direct influence on EfS efforts in the US by creating and implementing EfS curricula, disseminating academic standards, and facilitating the adoption of EfS practices.

The National Policy Landscape

Although there are promising signs that the US Department of Education is becoming more interested in sustainability, federal support for EfS has historically been limited and piecemeal. This is particularly true where K-12 classroom education is concerned. The first National Environmental Education Act (NEEA), passed in 1970, attempted to integrate EE content into primary and secondary education. It was poorly funded and poorly received among school administrators and was discontinued in 1975. The second NEEA, passed in 1990, conceptualized EE as a supplement to K-12 education rather than an integral part. No subsequent attempt to revive the broader terms of the 1970 legislation has secured sufficient political support to become law.

Not all federal leadership comes in the form of legislation, however. In 1993, President Clinton convened the President's Council on Sustainable Development (PCSD) in response to the international "Earth Summit" in Rio. The PCSD, which included representatives from government, industry, and nonprofit or nongovernmental organizations (NGOs), had no authority to make laws but was surprisingly successful in producing a consensus-based national vision and strategy for sustainability before it was disbanded in 1999 (Maurer, 1999).

In 1994, the PCSD sponsored the National Forum on Partnerships Supporting Education about the Environment "to broaden our concept of education to include sustainable development" (President's Council on Sustainable Development [PCSD], 1996). This forum initiated a 2-year consensus-building process resulting in the report *Education for Sustainability: An Agenda for Action*, which defined EfS as:

> a lifelong learning process that leads to an informed and involved citizenry having the creative problem-solving skills, scientific and social literacy, and commitment to engage in responsible individual and cooperative actions. (PCSD, 1996)

PSCD argued that EfS should be a community-driven project, controlled and implemented by local authorities, but it also noted that "there is an opportunity for officials to address the lack of effective coordination among the educational activities of individual agencies" (PCSD, 1996). Although the report is largely forgotten, many of its observations and recommendations are as relevant today as they were 15 years ago.

Between 1999 and 2009, federal agencies continued their support for EfS, but their efforts lacked central coordination and strategy. The Environmental Protection Agency (EPA) has been the most consistent supporter of projects related to EfS. Between 1992 and 2009, the EPA gave out about 30 million dollars through its Environmental Education Division (U.S. Environmental Protection Agency [USEPA], 2009). Although this is a small amount relative to total federal expenditures on education, the EPA requires most grant recipients to find matching funds and encourages the dissemination of best practices and research findings through professional networks. This strategy has helped produce a tightly networked EE and EfS community.

Recently, there have been signs that the federal government once again wishes to take a leadership role in EfS. Following the Secretary Duncan's admission that the Department of Education had "fallen short" of the goals established in the PCSD's 1996 report (Duncan, 2010), several new initiatives were launched. Some, such as the initiative to develop green career pathways within vocational education, were clearly adjuncts to the Obama administration's "green jobs" initiative. Others, such as the extension of educational granting mechanisms to include EfS, corrected omissions in earlier policy (Duncan). Although none of these initiatives is a radical break with past policy, the Department of Education's return to sustainability is still a significant moment in the history of American EfS.

The State Policy Landscape

Because state and local agencies have legal authority for education in ways that the federal government does not, their policies play a critical role in shaping educational practice in the United States. Almost all states support EfS, but the level of support varies widely. At the most basic level, many states have created state-specific networks that connect practitioners with resources and with each other. Some states, such as Minnesota, emulate the EPA by offering block grants to support EfS projects in schools and communities. A small but increasing number of states have passed laws or otherwise altered their education policies to include EfS. This is typically done by establishing content standards (as in Vermont, Washington, Wisconsin, and Maryland), changing teacher education requirements (as in Washington, Pennsylvania, and Wisconsin), or providing flexibility through charter school legislation[1] (as in over 40 states).

Because state EfS programs are different, and because they change constantly, it is difficult to offer an accurate account of state action on EfS. EE progress offers one imperfect proxy. Three nationwide surveys that tracked state progress relative to a hypothetical "comprehensive state-level environmental education program" (Archie, 2011; National Environmental Education Advisory Council [NEEAC], 2005) found that states are doing more than they were 15 years ago, adding initiatives to increase structural, financial, and programmatic support for EfS. Between 1996 and 2005, states collectively almost doubled the number of EE program components they provide (National Environmental Education Advancement Project, 1995, 2005). Today, 47 out of 50 states are actively developing "environmental literacy plans" (North American Association for Environmental Education [NAAEE], 2011). States that are

[1]Charter schools are public primary or secondary schools, which are not subject to all of the rules and regulations that apply to other public schools. Charter schools are accountable for producing results set forth in each school's charter. Charter schools have open enrolment and are attended by choice. Charter schools are not allowed to charge tuition. State-level legislation allows or disallows establishing charter schools.

frequently cited as EfS innovators include California, Massachusetts, Minnesota, Oregon, Vermont, Washington, and Wisconsin. In Chap. 8, Gilda Wheeler offers an in-depth description of Washington State's efforts to integrate EfS into K-12 education. For the purpose of illustration, though, we offer a briefer description of Wisconsin's multifaceted approach.

In 1935, some 35 years before the first NEEA, the Wisconsin legislature passed the nation's first statute requiring the teaching of conservation in public schools. In 1985, Wisconsin's legislature passed a law requiring school boards to develop a written, sequential curriculum plan in environmental education. Wisconsin lawmakers also updated teacher certification requirements for early childhood, elementary, agriculture, science, or social studies teachers, obliging them to

> demonstrate competencies in natural resources and their conservation; ecological principles; people-environmental interactions, energy in both biological and physical systems; and the use of cognitive, affective, and citizen action skills teaching methods. (Wisconsin Department of Public Instruction [WDPI], 2008)

In 1998, the Wisconsin Department of Public Instruction (WDPI) published *Wisconsin's Model Academic Standards for Environmental Education* (WDPI, 1998), which included five overall content standards as well as concrete performance indicators, and these are cross-referenced with state standards in the traditional academic disciplines. Unlike the EfS standards in Vermont and Washington, Wisconsin's standards are not legally binding, but they may still serve as a resource for educators and schools around the state.

Unfortunately, Wisconsin also illustrates the gap between ideals and reality in state-level EfS policy. Despite the state mandate, only 30% of the districts reported having an EE curriculum plan in 1992. Similarly, despite the legal requirement for teacher certification, only 46% of teachers certified in 1985 or after reported receiving preservice EE training (Lane, 1996). Unpublished survey data suggest that not much has changed since that time.

The Role of Nongovernmental Organizations

Where national and state governments have left a leadership void in EfS, NGOs have stepped in, establishing guidelines for EfS practice, advocating for EfS policy at the state level, and building capacity in schools and communities. In Vermont, the nonprofit educational organization Shelburne Farms was instrumental in organizing the community meetings that led to the adoption of Vermont's sustainability standards (Vermont Education for Sustainability, 2000) and have since played a central role in the state's EfS capacity-building efforts (see Chap. 9 for a description of one such effort). Two NGOs, the US Partnership for Education for Sustainable Development and Facing the Future, helped frame curriculum and teacher education standards for Washington State (Wheeler, personal communication, February 24, 2009). In the state of New York, the Putnam/North Westchester Board of

Cooperative Educational Services hired an NGO called The Cloud Institute for Sustainability Education to develop curriculum modules that are now used in dozens of schools.

These cases, and others like them, illustrate how NGOs exert their influence in partnership with state and local governments. Often, as in Vermont, they act as facilitators, connecting stakeholders and empowering them to exert a greater influence on policymakers. At other times, as in the state of New York, they build capacity, helping schools and educators clarify and pursue their own sustainability education goals. In a few important cases (such as the *Environmental Education Collection,* described in Sect. 3.3.1), they help document existing practices and establish standards for quality in EfS (NAAEE, 2004b). Behind some of these efforts is the indirect support of the federal government, which offers grant funding to educational NGOs. More direct support is also provided from the private sector in the form of grants from philanthropic foundations and industry.

Changing Practices

Like the complex and ever-changing landscape of state policy, the hardwork of EfS practitioners is difficult to document or summarize. The United Kingdom (Huckle, 2009) and countries such as Germany (Rode & Michelsen, 2008) have started to develop comprehensive systems to monitor EfS, but so far, there is no indication that the United States will follow. This is unfortunate because many of the most compelling examples of EfS emerge from schools and classrooms where dedicated practitioners have adopted, adapted, or created programs to suit local conditions. It is possible, however, to offer a general picture of innovation and change in the United States EfS by focusing on three overlapping aspects of EfS in the K-12 system: curriculum, pedagogy, and whole-school projects.

Curriculum

In the United States, curriculum reform often proceeds through an unplanned "push-pull" process, in which the content of instruction is shaped by legislative "pushes" from state and local government and "pulls" in the form of resources from independent curriculum developers. This process is a consequence of the relative autonomy that most teachers have in choosing what to teach. Working within the constraints of federal, state, and local curriculum standards, teachers often choose to adapt existing curriculum materials rather than develop their own—particularly when they lack confidence in a subject they are required by law or driven by principle to teach.

Teachers who wish to integrate EfS into their classrooms can choose among curriculum resources produced by university-based research groups, for-profit

companies, and NGOs. Some of these resources, such as the water education materials produced by Project WET, have reached millions of children in the United States and other countries. The diverse array of resources presents a challenge in its own right: teachers must choose from a bewildering selection of materials. Many organizations attempt to assist teachers by collecting and indexing EfS-related resources. The most ambitious such attempt is *The Environmental Education Collection: A Review of Resources for Educators*, a peer-reviewed collection established by the North American Association for Environmental Education (NAAEE) (2004a).

It remains to be seen how useful *The EE Collection* and other such resources will be for EfS practitioners in the years ahead. Many curricula labeled "environmental education" focus more narrowly on issues of environmental conservation and do not fit commonly used definitions of EfS. In particular, many of the most prominent curricula do not deal with issues of social equity. Although there has always been a thread of concern for equity and social justice within the broader field of environmental education (e.g., Cole, 2007), social and environmental justice are rarely a central focus of mainstream EE (Kushmeric, Young, & Stein, 2007).

One of the most exciting areas of growth in EfS, and one that is often overlooked in the literature, is career and technical education (CTE). In new and promising CTE curricula, such as the Sustainable Design Project led by the Department of Education in Washington State, older K-12 students work in teams to find solutions to wide-ranging sustainability challenges, drawing on assistance from nearby universities and the private sector (Washington Office of Superintendent of Public Instruction, 2011). The federal government has also become involved in sustainability projects for CTE by supporting the development of five replicable program models in five different states (Kanter, 2010). It remains to be seen whether these programs will successfully integrate technology and entrepreneurship with other sustainability concerns, but the growing availability of curriculum materials in CTE is an important step forward.

Pedagogy

By some measures, EfS (or at least the environmental component of it) is quite common; in 2005, Coyle reported the results of a nationwide survey showing that "nearly half of all K-12 teachers indicate they teach Environmental Education during the school year." At the same time, most of the teachers surveyed spent little time on environmental topics, and little data are available for the topics they taught or the pedagogical strategies they used (Coyle, 2005, p. 68). Based on the number of teachers who are reported to use ready-made curriculum resources, it is reasonable to assume that many teachers use prepackaged materials. Many others may rely on informal educators who work with schools on a contract basis.

Prepackaged curriculum materials are not the whole story, however, and two older pedagogical models from environmental education foreshadow a contemporary

trend toward EfS that is grounded in local sustainability concerns. Although many other models could have been selected, these two are unusually well documented in the research literature. The first model, Investigating Environmental Education Issues and Actions (IEEIA) is based on the behavior change theories of Harold Hungerford and Trudi Volk. It is "designed to help learners take an in-depth look at environmental issues in their community, to make data-based decisions about those issues, and to participate in issue resolution" (Volk & Cheak, 2003, pp. 12–13). Students participating in IEEIA programs identify environmental problems that matter to them, set goals, and work together to first investigate and then address these problems. Along the way, they systematically collect and analyze data through surveys and questionnaires.

IEEIA is among the most thoroughly documented pedagogical strategies in environmental education. Over a dozen papers have examined IEEIA programs in many separate locations over 20 years. This body of research is methodologically imperfect,[2] but the uniformly positive results—changes in attitudes, knowledge, and behavior—are still impressive (Hungerford, Volk, & Ramsey, 2000; Volk & Cheak, 2003).

Environment-Based Education[3] (EBE) is another distinct pedagogical movement that takes a more discipline-oriented approach. EBE pedagogy is described as "interdisciplinary, collaborative, student-centered, hands-on and engaged" (National Environmental Education and Training Foundation [NEETF], 2000). The truly distinctive feature of EBE, however, is cross-curricular integration: in the archetypal EBE unit, teachers from multiple disciplines coordinate their planning so that students repeatedly address a complex and compelling environmental problem using different disciplinary tools as they travel from class to class.

Although the sustainability-related outcomes of EBE are unknown, its effect on achievement in the disciplines is impressive. When compared to students in demographically similar schools, students in schools or within-school programs implementing EBE demonstrated higher achievement in subjects such as social studies, mathematics, and science; their reading scores also improved, sometimes dramatically (Lieberman & Hoody, 1998). There are conspicuous weaknesses in the methods used to study EBE, but the documented effects are large and have been supported by more recent quantitative and qualitative research (Athman & Monroe, 2004; Falco, 2004; NEETF, 2000).

Both IEEIA and EBE are defined in terms of environmental themes and outcomes and therefore focus on only one aspect of sustainability. On the other hand, the key elements that define these two pedagogical models have become central to more recent forms of American EfS. In particular, the focus on interdisciplinary, student-centered instruction and the attention given to authentic sustainability challenges are increasingly characteristic of EfS initiatives in the United States. One of the most visible of these is place-based education.

[2]Most studies relied on post-only comparisons between intact groups and inadequately established the comparability of comparison groups.

[3]EBE is also referred to as EIC: Environment as an Integrating Context™.

Place-based education (PBE) is historically connected to EBE, but it is framed in terms of sustainability. *The Promise of Place*, an online clearinghouse for relevant materials, evokes prominent international definitions of EfS when noting that PBE "fosters vibrant partnerships between schools and communities to both boost student achievement and improve community health and vitality—environmental, social, and economic" (Promise of Place, 2009). PBE researchers have focused on a broad set of outcomes, including improved community-school relationships, stronger collaboration between teachers, and improved outcomes for students with special needs (Powers, 2004). Most recently, Duffin, Murphy, and Johnson (2008) have taken the first step toward demonstrating a connection between PBE programs and local environmental quality.

PBE is representative of a larger trend toward school-community collaboration in EfS. School gardens are one obvious manifestation of this trend. Although schools have used gardens as learning environments for over a century, the number of school gardens is increasing, as is the willingness of teachers and schools to integrate gardens into every aspect of their operations, from food preparation to curriculum design, often with explicit sustainability goals (Dillon, Rickinson, Sanders, Teamey, & Benefield, 2003; Ozer, 2007). School gardens are especially common in elementary schools, which often lack staff time or appropriately trained staff and must rely on community partners to develop their garden programs.

School-Level Projects

School gardens are only one of the ways in which schools, rather than individual teachers, undertake EfS. Compared to its minimal classroom presence, EfS is surprisingly prominent in whole-school reform efforts. Hundreds of schools around the United States have instituted reforms based on what they identify as sustainability principles. Many of these schools, often called "sustainable schools" or "green schools," are private or charter schools. Relatively independent of public school networks, they participate in networks such as the Green Schools Alliance (GSA) and the National Association of Independent Schools that support their sustainability-oriented programming. Public schools that adopt sustainability principles usually do so as part of district or regional initiatives. Statewide networks of public schools with a sustainability focus can be found in states such as Vermont, Oregon, California, and New Jersey.

Both the national networks for independent schools and statewide public school networks attempt to leverage local expertise and educational resources (often from NGOs) to enhance school-based EfS. Some networks, such as the National Association of Independent Schools, encourage their members to include a wide range of concerns, from energy efficiency to demographic diversity, in their sustainability programming (Bassett, 2005). Other networks, such as the Green Schools Alliance, take a narrower but more aggressive stance. To become members of the GSA, schools must commit to monitoring and reducing

their carbon footprints—though this narrow goal is intended to be the core of a more comprehensive effort to engage students, teachers, and administrators in sustainability-related projects (Green Schools Alliance, 2009).

Many whole-school EfS programs begin with "green" building and energy-use practices. For example, the New York City Department of Education requires all public schools in New York City to appoint a sustainability coordinator. These coordinators are primarily responsible for resource and energy conservation but are also expected "to be the conduit for sustainable curriculum development initiatives" (New York City Department of Education, 2011). Most research on green schools has focused on their health benefits to students and staff (Board on Infrastructure and the Constructed Environment, 2006). A small number of studies have begun to suggest that sustainably designed buildings also have positive academic, attitudinal, and behavioral effects (e.g., Edwards, 2006).

Challenges and Questions for the Future

Despite clear progress, especially in the last few years, EfS is still a marginal part of US K-12 school system. In the previous sections, we outlined some of the recent positive changes and offered a few concrete examples of EfS in US schools. In this, the final section, we briefly outline three overarching challenges that American EfS currently faces. These challenges concern the audience, institutionalization, and goals of EfS.

The audience challenge can be boiled down to a single question: Who is EfS for? EfS, like EE, is at risk of becoming an educational luxury, available primarily to privileged groups within American society. This is a natural consequence of a public education system that faces entrenched inequality and has other educational priorities. Private and independent schools, as well as high-resource, high-performing public schools, face less testing pressure and can afford to invest in curricula and pedagogy that reach beyond the academic core. Resource-poor schools with poor test scores—schools that serve a disproportionate number of ethnic, cultural, and language minority students—are forced to eliminate EE and EfS, along with anything else that is not on state performance tests. It could be argued that the best way to ensure curriculum coverage of EfS would be to include EfS in high-stake assessments, something that presents enormous practical and ideological challenges.

Assessment is only one aspect of the second challenge facing EfS—institutionalization. In the United States, as in other countries, the growth of EfS is hampered by lack of space in the curriculum, time in the school day, and, perhaps most importantly, lack of capacity among educators (Feinstein, Jacobi, & Lotz-Sisitka, in press; Nolet, 2009). Although some states are beginning to establish EfS standards and teacher certification requirements, Wisconsin's example demonstrates that legislation may have a limited effect on practice.

Underlying both of these challenges are profound conceptual questions about the goals of school-based EfS. Other chapters in this book discuss the goals and

conceptual foundations of EfS within their local contexts. We do not wish to repeat their arguments here. Still, we would be remiss if we did not point out that all of the most exciting areas of growth for EfS, including curricula on green design and entrepreneurship, pedagogies of place-based education, and the emergence of new school-community partnerships, raise critical questions about the goals of EfS. How do we balance the convergent but distinct goals of changing behavior, transforming our economy, and preparing citizens? How can we best measure our success? Can nations and states set EfS standards, or is sustainability an irreducibly local concern? These are not new questions, but the growth of EfS means we must acknowledge and address them.

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