

Kindergarten Through Twelfth Grade Education: Fragmentary Progress in Equipping Students to Think and Act in a Challenging World

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This chapter summarizes the development of education for sustainability (EFS) over the last five years at the K-12 level—changes in what children learn in classrooms from kindergarten through high school graduation that affects their ability to contribute to a healthy and abundant world. EFS includes the time-honored goals of environmental education, such as knowledge of Earth’s systems and cycles and imbuing students with an ethic of environmental stewardship, and adds a few new goals:

- Comprehending the dynamic connections among economies, the values and practices of societies, and the ecosystems that sustain human life;
- Thinking systemically, critically, and across disciplines about issues, problems, and solutions;
- Valuing and seeking to nurture the well-being and specialness of home places;
- Gaining the skills and inclination to work in community with others, on scales from the personal to the global, to achieve a more sustainable world;
- Being able to learn continuously and to challenge assumptions and mental models in order to keep moving toward sustainability in a complex and ever-changing world.

Why reform our K-12 educational system to attain these goals? There is strong evidence that not only specific habitats but indeed our entire planet is in serious environmental crisis,¹ and that “business as usual”—continuing, around the globe, to grow our energy use, consumption, and waste—is the cause, rather than a few easily correctable flaws in the practices of human societies. Comprehensively reforming our educational system can redefine business as usual as it

shapes the knowledge, attitudes, and values of every student in the United States—every future voter and worker in a country whose decisions disproportionately affect the state of the world. K-12 education offers a crucial opportunity to equip people to evolve new, life-sustaining modes of meeting human needs.

There has been remarkable success over the last five years in K-12 education for sustainability, although some threats and some serious challenges remain. More mainstream institutions and school systems (the Scarsdale, New York, system, for example) are embracing sustainability paradigms with positive effects on K-12 education. More educational efforts self-consciously and directly seek to imbue students with sustainability-enhancing knowledge, attitudes, and skills. A few new funding streams exist, and others promise to grow. Research results increasingly support the benefits of pedagogies and practices that support K-12 EFS, and both new and established educational materials that are attractive to teachers and useful in American educational settings help to advance many facets of K-12 EFS.

A current snapshot of K-12 education for sustainability, however, also has its shadows. Shorter-term trends in education pose some serious obstacles to advancing sustainability knowledge and practice, and the recent heightened focus on testing in traditional subjects makes it difficult for sustainability's interdisciplinary approach to gain a foothold. Needed changes in the K-12 teaching of many subjects, particularly economics, are slow to come. Religious traditions increasingly are elaborating and promulgating their particular understandings of humankind's relationship to nature, which has made some faith traditions active allies for EFS but others strenuous opponents. Progress toward K-12 EFS will remain fragmentary and incomplete until all positive trends fully flower and all these obstacles are overcome.

The National Zeitgeist

Americans increasingly acknowledge environmental problems and seek solutions to them, which has provided essential support for progress in EFS. While there has always been substantial room for maverick innovators in American education, the mainstream, in the United States and elsewhere, is generally conservative and normative: education serves to prepare students for success in a given society, as imagined and conceived by established experts in existing fields and as developed into training programs by educators. Progress in imbu-

ing the general population with an understanding of how a healthy environment is relevant to our future wellbeing is therefore a prerequisite to widespread sustainability-supporting changes in our educational programs. Thankfully, such progress is finally occurring in the United States. The last five years have seen the publication of many credible and grim assessments of our global future²; the mounting evidence for global warming and its huge potential for harm has finally begun to affect the behavior of government institutions, businesses, faith traditions, and the public, thanks to the sheer weight of confirmatory data and to many recent successful educational efforts.³ More college and graduate programs are evolving to include sustainability and environmental precepts and requirements, not just implicitly or peripherally but as clearly stated and central aspects of their mission.⁴ All these changes are beginning to affect K-12 educational institutions as well, with even stronger impacts to follow as our institutions seek to accomplish their aims in ways that also safeguard the environment.

Although vague and more difficult to quantify, recent trends in work and lifestyle are also helping. More schools, responding to these trends, are critically addressing consumerism and its promised rewards.⁵ Increasing job and income insecurity is making some educators focus on preparing students to obtain an adequate slice of a shrinking pie, but others are exposing students to the broader range of worklife and lifestyle choices currently abounding in America, some of which (e.g., voluntary simplicity, balancing work and personal/family goals) can serve as models for more sustainable and satisfying lives.⁶

Some American religious denominations pose obstacles to the goal of educating all American students to fashion a more sustainable world. In a 2005 Newsweek poll, an astonishing 55 percent of Americans claimed to believe in an imminent apocalypse⁷; believing that the world will end soon can make environmentalism seem pointless.⁸ Some fundamentalist faiths oppose the teaching of evolution, which is critical for understanding Earth's systems and cycles, and some focus on the world to come and find little value in engaging with the material world. Many parents with such beliefs are home-schooling their children or sending them to independent schools lacking a strong EFS curriculum.⁹ On a hopeful note, however, many American evangelical faith traditions are fostering "creation care"

and are helping students in faith-based schools learn to safeguard the health of the environment.¹⁰

Standards and Capacity Building

Over the last five years, educational standards have increasingly supported EFS, and many states have launched new efforts to mobilize more resources to attain EFS-relevant goals, particularly in environmental education. Vermont continues to require schools to attain two explicit EFS standards,¹¹ and a growing number of states have adopted explicit environmental literacy standards, providing official requirements and expectations for this important component of K-12 education for sustainability. In the past, EFS goals have been addressed by science and social studies standards, but only indirectly and not comprehensively. Existing educational goals have hit some EFS “targets” without having EFS as a stated goal. Under explicit standards, not only is an EFS goal being achieved, but it is being *targeted* because an educational standards-setting board has acknowledged that it is important. For example, some environmental literacy was achieved with older science standards, but never was comprehensive environmental literacy a stated goal of a state’s educational system. Occasionally, now, states have forthrightly stated that environmental literacy is a goal, and there are some educational standards that help students achieve it.

The Secretary’s Advisory Group for Environmental Education (SAGEE) has been active in Massachusetts, having published benchmarks, promulgated effective environmental education models, and worked to implement the statewide Environmental Education Plan.¹² California is poised to begin implementing its Education and the Environment Initiative (EEI).¹³ Numerous Oregon schools are active in the Sustainable Oregon Schools Initiative,¹⁴ and Minnesota’s Office of Environmental Assistance has developed a comprehensive and influential Environmental Literacy Scope and Sequence.¹⁵ Washington State offers E3 Washington, an initiative “for an inclusive process to develop a comprehensive statewide environmental education plan that optimizes environmental education for everyone who lives, learns, works, and plays in Washington State.”¹⁶ An evolving partnership between the North American Association of Environmental Educators (NAAEE) and the National Council for Accreditation of Teacher Certification (NCATE) could have positive effects on teacher education: NAAEE will help shape the standards that apply to teacher

education programs, which may prove to be a productive avenue for equipping more new teachers to cover environmental and sustainability topics effectively.¹⁷

Research and Funding

There has been a wealth of positive results supporting the benefits of EFS-relevant pedagogies and practices over the last five years, and some positive developments in funding EFS in schools. Recent research and reports in Washington State in 2004-2005 demonstrate positive correlations between environmental education and achievement on state tests.¹⁸ New evidence also confirms many educational benefits of place-based education, which is EFS-supportive because it immerses students in an interdisciplinary study of, and connection to, the problems and potentials of their home places.¹⁹ The National Environmental Literacy Assessment, an effort to benchmark current attainment of U.S. middle-school environmental literacy, is underway; this government-funded study should prove extremely useful in documenting the benefits and achievements of future environmental education and EFS initiatives.²⁰

EPA grants continue to support environmental education, and sometimes even explicit K-12 EFS projects.²¹ This funding, however, has been under threat over the last decade, and securing it has tied up much of the EFS community's fundraising efforts.

Recent concerns about children's health have supported efforts to educate children about food systems and healthy food choices. The Berkeley Food Systems Project's School Lunch Initiative, for example, provides mini-grants to area schools to link healthy lunch, experiential learning in gardens and kitchen classrooms, and formal academic study.²² The National Farm to School Network was launched in 2007 to connect schools to local, healthier, and more sustainable food.²³ Some creative educators have used funding from the Centers for Disease Control and new school wellness mandates to support sustainable food systems education.²⁴

Some promising new initiatives bode well for K-12 sustainability education to contribute to the health of children's minds and hearts as well as their bodies. An impressive collection of research is showing that experiences in nature that offer self-direction, play, free-ranging exploration, and contemplation are beneficial to children's emotional, psychological, and cognitive development,²⁵ and a new stream of

funding to connect kids to the natural world is emerging as a result. Most notably, the National Forum on Children and Nature, a new coalition of governors, mayors, corporate CEOs, heads of environmental organizations, and leaders from health and education institutions, “will invest several million dollars in projects with on-the-ground tangible results that address the issue of children’s isolation from nature.”²⁶ Meanwhile, a national coalition of environmental education advocates seeks to make “No Child Left Inside” part of the reauthorization of No Child Left Behind and to pass the No Child Left Inside Act in Congress (funding to train teachers and develop model environmental education programs).²⁷

Overall, government grants have not abounded in recent years to support the interdisciplinary exploration of real-world issues from a sustainability framework, nor to prepare students to learn this approach. Independent foundations and corporations, however, are increasingly supporting sustainability projects, including those that involve children and K-12 education, and EFS activists are working to persuade sustainability-practicing companies to support efforts to train their future workforce.²⁸

Systemic School Reform

There has been substantial growth in the number of schools whose central mission is to prepare students to advance sustainability. Many of these schools embody this commitment in their facilities and operations. A recent *Green Guide* article lists the top 10 green schools, offering eco-friendly buildings, green operations, and a consistent environmental infusion into teaching and activities.²⁹ A continued interest on the part of school-reform funders (for example, the New American Schools Corporation) to fund small, innovative schools and charter schools also has produced some new environment-focused schools, some of which operate in partnership with an environmental NGO.³⁰

The long-term economic benefits of “high-performance” (energy and resource-efficient) construction are becoming evident to school building authorities across the country. In New Jersey, since 2002 all new state-funded school construction is required to follow the guidelines of the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, although many criticize the spotty and inadequate implementation and enforcement of this mandate.³¹ There is a wealth of new guidelines to support green school construction,³²

and many public school buildings fall under common regulations mandating that government buildings meet LEED standards.³³ Some state energy programs have set-asides to fund green energy in schools.³⁴ In California, the Green Schools Initiative seeks to employ green school practices and construction, seeking to avoid risks to student health.³⁵ Often, such school's green features are central to the school's curriculum—using the school, in David Orr's apt phrase, as “crystallized pedagogy.”³⁶

Given the vast numbers of independent schools in the United States, it is exciting that the National Association of Independent Schools (NAIS) has made a clear commitment to encourage and support education for sustainability in its member institutions, with diverse projects and capacity-building for its member institutions, teachers, and students.³⁷ Other noteworthy developments in independent K-12 sustainability education include the emergence of sustainability coordinators on independent school campuses³⁸ and the establishment of the E.E. Just Environmental Leadership Institute at the Kimball Union Academy in New Hampshire, serving as an EFS and environmental education resource for a growing network of independent schools.³⁹

There has been a growth in the institutional support for place-based education and in the number of K-12 schools seeking to implement place-based education. Shelburne Farms (Vermont), The Rural Trust, the Center for Place-Based Education, and the Monadnock Institute of Nature, Place and Culture all continue to work to connect students to their home places and to foster connections to their local environment, traditions, and history,⁴⁰ and both urban and rural programs are coming to see the educational worth of connecting children to their world.⁴¹

NGOs whose mission is to foster K-12 education for sustainability have grown in both number and scope over the last five years. Shelburne Farms offers a summer Education for Sustainability Institute and a Sustainable Schools Project to help schools attain Vermont's EFS standards.⁴² The Children's Environmental Literacy Foundation (CELFL), a new organization based in Westchester County, New York, and the Wallerstein Collaborative for Urban Environmental Education, based at New York University, seek to support environmental and sustainability education in urban public schools.⁴³ The Cloud Institute for Sustainability Education has grown its programs

regionally and nationally and helps school districts implement EFS.⁴⁴ Susan Santone’s Creative Change Educational Solutions also works with more schools in a more geographically diverse swath of the United States.⁴⁵ The Marion Institute has sponsored teacher training to bring the ZERI Learning Initiative, a project of Gunter Pauli’s Zero Emissions Research Initiative, more widely to the United States.⁴⁶ Facing the Future continues to offer teacher training and district support for implementing K-12 education for sustainability.⁴⁷ NAAEE offers workshops and symposia that are EFS-specific at its popular annual conference, and sustainability educators are appearing more frequently on the NAAEE board and its committees.⁴⁸ On-the-ground sustainability demonstration projects are increasingly common, and most offer curriculum and education to local K-12 schools—see, for example, New York City’s Science Barge, a sustainable urban farm, which hosts visiting classes.⁴⁹

Environmental education is also reaching faith-based independent schools. The Heifer Project’s work is noteworthy; as they raise money for sustainable agriculture in developing countries, they effectively teach many faith communities about sustainability. In New Jersey, Green Faith (a regional NGO focused on green energy for congregations) and the Center for Health, Environment and Justice (founded by “Love Canal” heroine Lois Gibbs) have launched a project to green the operations of faith-based schools. Genesis Farm continues to be an important source for Catholic educators seeking to imbue their education with an “Earth literacy” approach.⁵⁰ While the Evangelical Environment Network focuses on communities of faith, camps, and colleges, its conferences and materials are undoubtedly having an impact on some evangelical K-12 schools and helping them to foster an ethic of creation care.⁵¹

Promising Programs and Projects

Over the last five years, there has been a growth in programs and projects to implement education for sustainability; opportunities for students to explore crucial aspects of EFS have become more numerous, more engaging and effective, and more diverse. While comprehensive reform of K-12 curriculum and practices must remain the long-term goal, individual programs and projects enable some progress and often serve as a first step toward schoolwide penetration and commitment.

Planners, whose job is to contribute to regional sustainability, are providing EFS content for schools and NGOs that work with schools. The Brooklyn Center for the Urban Environment, for example, has launched the Academy of Urban Planning, which organizes its curriculum around sustainable planning.⁵² Moreover, EFS-focused NGOs also have been quick to connect to the burgeoning movement for regional sustainability planning. The Cloud Institute for Sustainability Education, most prominently, works with several regional authorities to create synergies between local sustainability planning and K-12 education; the city of Burlington, Vermont, includes its school system in the sustainability planning it undertakes.⁵³ The Sustainable Design Project, in Washington State, will soon be a public-private partnership that brings industry, business, and higher education partners together with K-12 classrooms to design sustainable solutions to real-world challenges.⁵⁴ The SoL Education Partnership fosters a national learning community of sites with school/community partnerships moving toward sustainability.⁵⁵

Several NGOs, notably the Cloud Institute for Sustainability Education and Earth Day Network, work with schools to infuse sustainability content and approaches into their civics curricula and activities.⁵⁶ Green energy projects continue—for example, Junior Solar Sprint, Kidwind, and the Green Schools project.⁵⁷ Independent schools now offer several networkwide programs and projects that are noteworthy, such as the 2020 Challenge and the Interschool Green Cup Challenge.⁵⁸ Education about, and participation in, sustainable food systems continues to grow; NGOs such as the Heifer Project and the Food Project work with schools to help children grow local food and learn about healthy and sustainable food options.⁵⁹ Service learning continues to offer water-quality monitoring and beach/riparian cleanups as a prominent student activity.⁶⁰ Environmental justice organizations also work with schools.⁶¹

There has been a growth in international sustainability-related projects, and in U.S. participation in them. A U.S. partnership was formed, for example, to support participation in the U.N. Decade of Education for Sustainable Development.⁶² The International Education and Resource Network (IEARN), an international organization of educators, reaches schools with its sustainability projects.⁶³ United States schools participate in the U.N.'s Water for Life project and in the U.S. Stockholm Junior Water Prize.⁶⁴ The National Science Foundation funds Global Challenge, in which United States and international high

school students work in partnership to create global warming solutions.⁶⁵ EFS educators in the United States work with the Center for Environmental Education (CEE) in Ahmedabad, India, which publishes a journal and held an international EFS conference in 2007.⁶⁶

There has been a promising surge in civic engagement among today's youth, some of which takes place in association with schools. The High School Ecological Literacy Project trains high school students to report on local environmental issues, and the Green Energy Council is seeking high school chapters.⁶⁷ Groups such as DoRight, a Westchester County middle school-run energy audit firm, are proliferating, and Eban Goodstein's Focus the Nation climate change campaign involves high school educational programs.⁶⁸

On the negative side, budget constraints and the weight of increased testing focusing on math and reading skills have made it more difficult for off-campus trips to nature centers. Nature center staff are resourcefully adapting, making a convincing case that diverse and numerous standards are taught via on-site nature exploration, and equipping themselves to visit schools.⁶⁹

Curriculum and Pedagogies

Progress continues in both the creation of exciting new material and the penetration of sustainability topics into what is taught in K-12 schools. The International Baccalaureate program, which is especially popular in high-performing schools, offers high school programs in design technology and environmental systems.⁷⁰ Advanced Placement World History includes the interaction between societies and the environment as one of its five major themes,⁷¹ and the Environmental Literacy Council now offers environmental history modules for high school teachers.⁷² Two new ecological economics textbooks suitable for use in both high schools and colleges now exist,⁷³ although their impact on the high school economics curriculum has not yet been felt. Nor have NGOs that promote entrepreneurship evolved to include "triple bottom line" thinking (assessing a company's impacts on society and the environment as well as its profitability) in the entrepreneurship training they undertake with American youth.

Facing the Future, The Cloud Institute, and Creative Change Educational Solutions offer a growing and diverse collection of resources to support K-12 education for sustainability.⁷⁴ The Center for a New

American Dream and the World Wildlife Fund have prepared *Smart Consumers: An Educator's Guide to Exploring Consumer Issues and the Environment* for middle-schoolers.⁷⁵ Great tools exist for the K-12 teaching of systems thinking, but this approach is still not widely found in K-12 schools, despite an established and active community of committed systems-thinking educators.⁷⁶

High school earth science classes help students develop the knowledge base, critical thinking, and scientific reasoning needed to evaluate global warming arguments and evidence, and global warming appears more often in middle school science programming as well.⁷⁷ More than 50,000 classroom teachers received a free copy of Al Gore's climate change opus, *An Inconvenient Truth*, with a free downloadable educational guide.⁷⁸

Mainstream curriculum organizations now offer curricula that are more supportive of K-12 education for sustainability. Project Learning Tree, for example, now offers *Exploring Environmental Issues: Places We Live*, illuminating the connections between environment, society, and economy, and the United Nations Association of the United States offers a new Model U.N. unit on the Commission on Sustainable Development.⁷⁹ Because these organizations have credibility and a broad client base, they will bring EFS to more and more schools and educators.

Recommendations for Future Progress

Five recommendations for future progress in EFS follow, based on the analysis and information in this chapter.

1. Standards and Capacity-Building. For decades now, support for EFS in existing standards and educational goals has been spotty and scattershot. K-12 education now needs to embrace EFS as a clearly-stated and central goal, and content and performance standards need to be redefined to attain this goal. More explicit support for sustainability in state-mandated and other influential content and performance standards would produce widespread improvement in EFS. Advocates for EFS in K-12 education must find new ways to encourage the national discipline-specific organizations and the state boards that establish standards to include EFS as a central goal throughout K-12 education. Guides to implementing standards can use EFS examples and content.⁸⁰ Work must advance in reforming testing regimes so that they are more attuned with EFS pedagogies, goals, and

content knowledge. Successful statewide mobilizations for EFS, such as those in Massachusetts and Oregon, need to support fledgling efforts in other states.

2. *Research and Funding.* EFS advocates must secure funding to scale up current EFS efforts in the United States. The endeavor currently lacks consistent and sufficient funding for more than piecemeal attainment of its goals. Corporations, some of which are becoming sustainability leaders, must be persuaded to support the proper training of America's future workers and leaders. Foundations need to recognize the importance of funding EFS; it is a riskier and more long-term commitment than directly investing in environmental protection, but EFS is crucial to the future of our environment. The last 30 years have demonstrated how limited progress in laws and regulations can be without widespread popular commitment to environmental goals and values. EFS is crucial to providing the necessary broad support for all environmental progress; there is no shortcut. School reform remains a messy and inexact process, but there has been progress lately in compiling data to guide efforts to reform educational institutions to make them more supportive of EFS. EFS advocates must impress upon foundations the importance of EFS to all their goals, and must also help foundations recognize that money invested in EFS will produce tangible results. Securing government funds, through working with politicians and by electing EFS supporters to office, would also help immensely.

3. *Systemic School Reform.* Progress must occur in infusing EFS on a wide scale into the professional development of pre-service and working educators. This will require both the transformation of established professional development programs and the expansion of those teacher training offerings that already support EFS. National educational networks (NAIS is a shining example) need to share the best practices found in EFS model schools among their memberships. Established pedagogical models must be engaged and transformed so that they more explicitly and effectively support EFS. EFS practitioners must also form coalitions with other kinds of school reformers to advance pedagogies and goals that support EFS (e.g., students as life-long learners, schools as learning institutions). An effort must be directed at engaging faith-based schools in realizing EFS goals in their educational programs; full weight must be given to the societal progress that can be result if this goal is achieved.

4. Curriculum and Programs. The producers of established and popular curricula and textbooks need to be further engaged to strengthen EFS in their offerings. EFS curricula must become even better at being teacher-friendly and being attuned to the realities of those who choose and use curriculum (e.g., providing activities that work for classes that mix mainstream and special needs students). Influential NGOs that offer K-12 school programs (e.g., Junior Achievement) must be engaged so that their popular and widespread offerings can support EFS.

5. The National Zeitgeist. Nothing will help to advance K-12 EFS more than growth in societal demand for educational programs that equip students to create a more sustainable world. All those with a role and a stake in our future (parents, universities, business, and government) must model sustainability, involve schools in their own efforts to progress toward sustainability, and advocate for EFS (and the funds to implement EFS) in our school systems.

Conclusion

Some piecemeal and some comprehensive progress has been made both in the preconditions needed for K-12 education for sustainability to flourish and in the institutions and materials needed to teach students what they need to know to contribute to a more sustainable world. Those committed to K-12 EFS feel immense pressure to achieve this important goal in time to safeguard the quality of human life. A groundswell in both public understanding of environmental problems and in societal commitment to sustainability-enhancing actions has opened doors and created new opportunities to transform institutions and reach our teachers and students. Efforts must continue to persuade school officials of the crucial importance of educating children so they can act sustainably as workers and citizens, and also to create quality and effective programs and curricula to achieve this goal.

ENDNOTES

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2. *See, e.g.*, the documents cited *supra*, note 1.
3. Notable recent films include Al Gore's *An Inconvenient Truth* and Leonardo DiCaprio's *The Eleventh Hour*; notable organizations include Bill McKibben's Step it Up (stepitup2007.org/) and Environmental Defense's Fight Global Warming campaign (www.fightglobalwarming.com).
4. Overall progress can be seen in the growth and work of the American Association for Sustainability in Higher Education (AASHE) (www.aashe.org); progress in business schools can be found in THE ASPEN INST., BEYOND GREY PINSTripES 2007-2008, *available at* www.beyondgreypinstripes.org/rankings/bgp_2007_2008.pdf (accessed Nov. 18, 2007); *see also* Wynn Calder & Julian Dautremont-Smith, *Higher Education: More and More Laboratories for Inventing a Sustainable Future*, Chapter 7 in this volume.
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22. *See* School Lunch Initiative website, www.schoollunchinitiative.org/; and www.ecoliteracy.org/grants/index.html.
23. *See* National Farm to School Network website, www.farmentoschool.org/state-home.php?id=18.
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