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Toward Better Environmental Education

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Toward Better Environmental Education

Jane S. Shaw

Tom Furrer, a science teacher at Casa Grande High School near San Francisco, remembered a creek that he used to visit as a child. To help his suburban students appreciate the outdoors, he wanted to bring them there. But when he rediscovered Adobe Creek after so many years, he found it to be a mere trickle, with treeless banks of hard dirt. What little water remained was full of washing machines, box springs, and other junk. It looked dead.

It wasn't utterly dead, however. Someone had protected a few pools where steelhead trout could still spawn and somehow make their way to the ocean. Furrer challenged his students to build on that effort and restore the creek. The future of the steelheads "belongs to your generation, not mine," he told them. "You'll be leading this battle" (McConnell 1999, 81).

His students formed a club, the United Anglers of Casa Grande High School. First, they pulled the junk out of the stream and carried it away in their pickups. Then they planted willow tree cuttings along the stream to end the erosion. Eventually, they started a hatchery that would nurture trout and salmon hatchlings for Adobe Creek and other streams.

It took more than ten years. Some of those students were well into adulthood—and some of them biologists—by the time a dam was removed and the steelhead trout could flow freely. By then, they had created a tradition and learned a lot about ecosystems, fish, and human nature.

Jack Stauder, a cultural anthropologist, teaches an environmental course at the University of Massachusetts at Dartmouth. One holiday he visited his sister, a fan of the radio talk show host Rush

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Limbaugh.

Hearing Limbaugh talk about environmental issues, Stauder was “both fascinated and scandalized.” Limbaugh minimized the severity of environmental problems— “flying in the face of what I knew about the threats to our environment,” says Stauder (Stauder 1999, 15). He decided that when he got back to his university he would write an article refuting Limbaugh’s claims.

But once Stauder became engaged in this research, he was stunned. It turned out that Limbaugh wasn’t so off base, after all. Reputable scientists, in some cases, backed up Limbaugh’s positions. This forced Stauder to rethink his teaching. “I changed my environmental course from a lecture format to one emphasizing research and discussion,” he says (Stauder 1999, 21). Students took on specific issues such as acid rain and global warming and examined them critically. “Students enjoyed it, especially the fact that they were hearing both sides of the issue fully and fairly presented,” he said (Stauder 1999, 21).

Until her retirement a few years ago from a school district near Denver, Kathryn Ratté used environmental issues to help her students think critically. But it was hard to find good materials. She wrote in an essay:

I don't want exercises in programmed learning. I want experiential activities, with supplemental background readings and data, in which students must process information and observations and draw and support conclusions. The best way to do this is to offer real problems in real contexts, with real, identified people.

Give me a case study of an identifiable Amazon basin family making the choice between slash-and-burn agriculture and letting the rain forest remain as it is. Or present an interview with a Brazilian rancher deciding between clearing timber for grazing land and letting the rain forest remain. Give me the history of an African village where crops are destroyed by elephants and poachers can be put to death (Ratté 1999, 11).

Ratté found such cases. Instead of treating environmental issues as a morality tale, in which good

environmentalist “cops” assail bad polluting “robbers,” her students learned about choices and trade-offs.

Three teachers. Three illustrations of outstanding environmental education. If this were the way that most high school and college students learned about the environment, education about the natural world would be rewarding for teacher, student, and parent – and non-controversial as well.

Environmental Education Today

All too often, this is not the case. Frequently, instead of science, there is advocacy. Instead of understanding, there is simplistic morality. Instead of analysis, there is “group think.”

Evidence that environmental education has gone awry has been accumulating since the early 1990s, when parents began to notice their children coming home with strange ideas about the natural world. Parents were even condemned for working for the oil or chemical industry or for driving cars. As one parent wrote a letter to the *New York Times* around Earth Day, 1997, “I have noticed a disturbing trend. With each passing school year, my children are more convinced that humans and technology are bad for the planet ...” (Maxwell 1997, A28).

Some of the examples were so striking that even environmental magazines (such as *Audubon*) published articles suggesting that the schools were going too far, distorting environmental issues and disturbing children. In one article, the mother of a six-year-old child noticed that her daughter seemed sad as she was about to go to bed and asked why. “They killed trees to make my bed,” was the reply (Cardozo 1994, 112).

”With each passing school year, my children are more convinced that humans and technology are bad for the planet . . . “

Mounting numbers of anecdotes were followed by more comprehensive attempts to identify whether there is a serious problem or not. Because the American school system is decentralized, it is impossible to make sweeping claims about a subject like environmental science. In some places, the subject is

not taught at all; where it is taught, it is usually integrated into science or social science classes. There is no standardized test for environmental knowledge.

However, several reviews have confirmed that many widely used textbooks treat environmental topics with inaccurate science, an emphasis on advocacy, and unbalanced descriptions. *Facts, Not Fear*, a book that I had the privilege of co-authoring with Michael Sanera in 1996, describes how popular middle school and high school textbooks treated fourteen environmental issues such as acid rain, global warming, and water pollution at that time. We found that environmental education skips the basics, pushing students into complex and controversial topics such as endangered species preservation and global warming without establishing a sufficient scientific basis. In short, education can play second fiddle to emotionalism and political activism (Sanera and Shaw 1999, 1).

To illustrate the dangers of global warming, several textbooks published pictures of how flooded cities might look if the ice caps melted – including drawings of New York with all but the tallest buildings submerged. The reality is that even if global warming predictions for the 21st century were to come to pass, scientists anticipate that sea levels might rise by between 6 and 40 inches – not hundreds of feet!

One textbook after another had graphs showing world population climbing inexorably upward. Yet actual growth rates of population have been declining since the mid-1960s. The United Nations Population Division predicts that the world's population will level off in the 10 billion to 12 billion range at the end of this century. Some demographers doubt that population will reach even those levels.

In book after book – textbooks and also books found in school and public libraries – environmental depictions tilted toward exaggeration and gloom, often in contrast to well-accepted science. One book said that petroleum might run out in 20 to 30 years and natural gas in 20 years. Another told children that there would be mineral shortages “in your lifetime.” A third forecast that oil, tin, copper and aluminum might be “used up within your lifetime.” These gloomy forecasts are widely accepted by the public but largely are refuted by the facts. Other books

ignored environmental improvements that have taken place in the United States, from improved air quality to resurgence of eastern forests and wildlife populations.

Soon after Michael Sanera and I completed *Facts, Not Fear*, the Independent Commission on Environmental Education (which later became the Environmental Literacy Council), issued a report based on its study of environmental books and curricula that were “widely used or recommended by authoritative sources” (ICEE 1997, 1). The commission was headed by Robert L. Sproull, Emeritus President and Professor of Physics at the University of Rochester. It included nine other eminent scientists and economists such as Daniel S. Simberloff, a biologist known for his research in endangered and invasive species, and Thomas G. Moore, a former member of the president’s Council of Economic Advisers.

“Many high school environmental science textbooks have serious flaws,” the commission wrote in its report. “Some provide superficial coverage of science. Others mix science with advocacy”(ICEE 1997, 3). The commission warned, “Recommendations by even the most respected professional organizations are no guarantee of the accuracy or quality of the environmental education materials.” For example, they noted that a manual on environmental education funded by the Environmental Protection Agency, *EE Toolbox*, recommended a textbook that the commission had singled out as “one of the most troubling examples of the tendency to mix advocacy with science” (ICEE 1997, 42).

Sadly, the state of environmental education for K-12 students has not improved very much in the past five to six years. Children continue to receive information with a “tilt.”

In 2001, John Stossel, a reporter for ABC News, presented a television special on environmental issues called “Tampering With Nature.” His crew filmed children taking part in Earth Day events. Stossel found that children in Los Angeles were “bused in to hear speeches from activists during the school day.” The event was supposed to be “nonpartisan,” but the children were invited to sign a petition against White House environmental policies. One child said, “President Bush is polluting the country so he can

make millions for his friends” (Stossel 2002).

As part of the ABC News special, Stossel asked children if the air is getting more polluted. The children said – virtually with one voice -- “yes.” When he said that the government reports that the air has been getting cleaner, they responded by saying that whoever said that must be “lying” (Stossel 2001).

The Source of the Problem

Exaggerations regarding environmental problems do not begin at school. Schools transmit to children and youth messages about the environment that have been percolating throughout our society and, indeed, throughout the world.

Bjørn Lomborg, a statistician and political science professor in Denmark, used to embrace such ideas. Visiting in the United States, he happened to read a magazine article interviewing the late Julian Simon, an economist who argued that environmental conditions have improved. Lomborg thought that he should rebut this clearly mistaken opinion. Back at Aarhus University, he and his students set out to challenge Simon’s views.

“Honestly,” Lomborg, a former member of Greenpeace, recalls, “we expected to show that most of Simon’s talk was simple American right-wing propaganda. And yes, not everything he said was correct, but – contrary to our expectations – it turned out that a surprisingly large amount of his points stood up to scrutiny and conflicted with what we believed ourselves to know” (Lomborg 2001, xix).

Lomborg was soon writing a 515-page book that supports much of what Simon had argued. He begins the book, *The Skeptical Environmentalist*, with a quotation from Julian Simon, stating that “the material conditions of life will continue to get better. . . . I also speculate, however, that many people will continue to *think and say* that the conditions of life are getting worse” (Lomborg 2001, vii).

Lomborg contends that there is a “litany” of assumptions that nearly every educated person accepts – but never examines. These include the idea that we are running out of natural resources, that air and water pollution are worsening, that one hundred species go extinct every day. “We are [told that we

are] defiling our Earth, the fertile topsoil is disappearing, we are paving over Nature. . . .” But this view “ does not seem to be backed up by the available evidence,” he adds (Lomborg, 4).

With such ideas widely accepted and shared, it is not surprising that our school systems reflect the same opinions. Additionally, a variety of factors specific to schools help explain why they may perpetuate and even magnify myths about the environment. Here are some explanatory factors:

- Because attendance is mandatory, schools draw the attention of special interests that want to influence the adults of the future. As former Education Commissioner Francis Keppel said in 1976, “Sooner or later, many social reformers get around to trying to influence what is taught and how” (Aspen Institute 1976, 1).
- Activist environmental advocates have entered the field of environmental education on the university level and have created centers of environmental education. Although these centers develop curricula, some also campaign to make environmental education mandatory.
- The Environmental Protection Agency has an Office of Environmental Education that provides funds for educational materials, many of them written by advocacy groups.
- Because publishers must provide what their purchasers want, it appears that the consumers of textbooks (teachers and school administrators) are not demanding more balanced information.

What Should Be Done

The three examples of quality environmental education offered at the outset of this essay suggest ways to improve environmental education. Let us review them more closely.

Motivation

High school science teacher Tom Furrer’s challenge to restore Adobe Creek motivated the Casa Grande students. Experiencing nature can capture the imagination and focus the attention of students.

Although Furrer’s high school students started with the straightforward job of cleaning up a stream, the project became a passion that taxed their talents

and creativity as they tried to determine how to keep those steelhead swimming. Students had to learn about biology, ultimately creating their own fish hatchery. They became involved in civic action when they examined whether the dam blocking the flow of Adobe Creek was really necessary. A particularly interesting fact was that their activities (which merited a cover story in *Reader's Digest*) took place entirely outside the classroom.

Experiencing the outdoors motivates many children to explore and develop their scientific curiosity. "Even if the child comes away with nothing more than the idea that the outdoors is a neat place to spend some time for a while, that can be enough to generate some interest and concern for environmental issues later in life," says Michael Reiter, a professor of natural resources at Delaware State University (personal communication).

"Most children have a bug period; I never grew out of mine."

Harvard Biologist E. O. Wilson

This experience does not have to be provided by the schools. Centers for environmental education offer a way to combine enjoyment of the outdoors with learning about nature. For example, the Schlitz Audubon Nature Center on the shore of Lake Michigan in Milwaukee offers summer camps (including a "Bug Camp") for children. During the school year, Schlitz welcomes children from local schools, many of them from the inner city of Milwaukee. "It's hands-on touching, feeling, smelling, or anything that puts kids in direct contact with nature," says Jim Hyatt, an environmental educator there. "If you pique their interest, then they continue learning on their own. So we provide the spark" (quoted in Kloor 2002, 36).

For young children, nature education is entirely appropriate as a foundation for science. The famed biologist E. O. Wilson has said, "Most children have a bug period; I never grew out of mine" (quoted in ICEE 1997, 4). Reflecting that spirit, the Independent Commission on Environmental Education observes that "the natural world offers a rich addition to classroom study." Because children have "an immediate

interest in trees, insects, rivers, clouds, and animals, environmental studies may hold students' attention to a greater degree than other topics." Thus, the commission recommends "the lower elementary grades should begin the study of science with the study of the natural world."

Accurate Information

The lesson from University of Massachusetts (Dartmouth) cultural anthropologist Jack Stauder's research is that opinions and assumptions should be subject to scrutiny. Just as scientists themselves rethink their interpretations of the facts, teachers and students—and the public—should do the same, especially about issues that arouse controversy and emotional reactions. However, materials that encourage critical thinking are rare. Most of the conventional materials that teachers and students come across, both in the classroom and at newsstands and on television, emphasize exaggerated "doomsday" ways of looking at problems.

Because of the complexity of these issues – even renowned scientists are still trying to sort out the facts about many of them – controversial topics on which the science is unsettled should generally be avoided with young children. As students reach middle school and high school, however, controversial issues provide an opportunity for grasping the scientific method and for developing arguments based on facts. Debate and discussion can help students recognize that science progresses through continual reexamination of the facts and their interpretation.

The example of acid rain will illustrate the difficulty of knowing the "right" answer about environmental problems. In the late 1970s and early 1980s, broad public concern developed about the effects of acid rain. Although the term "acid rain" sounds like water that resembles the acid of a car battery, actually it is a term applied to rain that has a higher-than-normal concentration of hydrogen ions. Clouds or raindrops may pick up nitrogen oxides or sulfur dioxide from power plant emissions or car exhaust. When the water falls as rain, often many hundreds of miles away, that rain may be acidic. (Rain is slightly acidic by its nature, because of natural carbon dioxide and nitrogen oxides in the air, but "acid rain" refers to rain

that is acidic due to man-made air emissions.)

There were two major worries. One was that acid rain caused by emissions of sulfur dioxide from mid-western electric utility plants was falling on lakes in New York and New England, making them so acidic that fish could not survive. The other worry was that forests were dying because of acid rain.

The federal government conducted a \$500 million study to determine how serious the acid rain problem was. The conclusions from ten years of research by the National Acid Precipitation Assessment Program (NAPAP) were surprising. Although electric power plants and cars do contribute to acid rain, the researchers found that this rain had only a small impact. Fewer than 5 percent of the lakes around the country are “chronically acidic,” and some of this acidity is natural. In the Adirondack Mountains, one focus of the study, up to 30 per cent of the small lakes (between two and ten acres) are acidic, but some of these are naturally acidic, too.

As for the forests, the study found that acid rain might have contributed some harm to high-altitude red spruce trees in the Appalachian Mountains, but only in connection with other factors, such as the stress of cold winters. These forests represent less than one percent of the forests in the eastern United States (NAPAP 1990, 4-7).

This balanced view, which would lead one to be less alarmed about acid rain, was largely ignored or misinterpreted. So the term “acid rain” still conjures up a frightful problem when presented in textbooks and classrooms.

Fortunately, today there are some accurate, readable, and accessible materials on environmental issues. These materials include: *The Skeptical Environmentalist* by Bjørn Lomborg, *Facts, Not Fear* by Michael Sanera and Jane Shaw, and *No Turning Back* by Wallace Kaufman. Kaufman is a former environmental activist who began to question environmental propositions he previously assumed to be true. In addition, a new series of books for school libraries, published by Greenhaven Press, *Critical Thinking about Environmental Issues*, reviews the controversies involved with global warming, pesticides, and endangered species protection.

Realism

One of Kathryn Ratté's goals as a high school educator was to help her students understand that environmental problems are not morality tales, even though they may appear that way in the newspapers. For the most part, they are not stories about bad people who must be punished. More often, they are stories of how people just like you and me face difficult choices. In Kenya, a family may have to decide between protecting elephants or allowing poachers to kill them. Yet the elephants may endanger their children and tear up their grain storage bins at night and eat the whole year's crop. Economic principles help us understand how people make such choices.

Indeed, in recent years many environmentalists have come to realize that in order to protect animals like elephants and tigers, they must secure the cooperation of the people who live near the animals – those who bear the costs of having them around. In the United States, the elephant is considered to be a magnificent emblematic figure. In Africa, those who suffer from its marauding, consider the elephant a very big pest. In some parts of Zimbabwe and South Africa, however, local villagers have come to accept the elephant and to protect them from poachers. The reason for this positive attitude is that they receive payments from elephant hunters. Thus, recognition of the costs and benefits of environmental decisions can improve environmental success.

The lesson from Kathryn Ratté's experience is that economics offers a more constructive alternative to simplistic moralizing. Ratté has written her own curriculum on water resources entitled, "Are We All Wet?" Her materials educate students about economics while introducing them to some of the problems of water allocation and use. Other materials that apply economics to the topic of environmental issues include "Economics and the Environment: Eco-Detectives," and the *Environmental Examiner*, a newsletter published by the Political Economy Research Center (PERC) – my home base. [Information about these and other curricula can be found on PERC's Web site (www.perc.org).]

What To Do?

Motivation, respect for the facts, and realism—these are the principles that need to be applied to produce good environmental education. But how can we infuse environmental education with these attributes?

Motivation, respect for the facts, and realism – these are the principles that need to be applied to produce good environmental education.

Because of our decentralized education system, there is no “silver bullet” – no single curriculum, book, Web site, teacher training program, lobbying plan, or any other activity – that will ensure that environmental education is well conceptualized and accurately presented. Each group of concerned participants can take appropriate actions that improve on the status quo, however here are some suggestions.

College Professors and Students

The Skeptical Environmentalist by Bjørn Lomborg and *The Ultimate Resource* by Julian Simon are eye-opening books that should be read by anyone interested in environmental problems and availability of resources. Reading these books will help open the door to a broader perspective. For those who teach environmental science, the experiences of Jack Stauder and Bjørn Lomborg should be invigorating. Debates over environmental issues, if based on sound research, can be exciting and engaging.

Like their professors, college students should be skeptical and should read materials that challenge their thinking. [Some of the Web sites that will help students do this are www.perc.org, www.co2science.org, and www.healthfactsandfears.com, and www.techcentralstation.com.] Faculty teaching environmental science have sometimes become too narrow, relying on materials from environmental groups that may not pass scientific muster.

K-12 Teachers

No person can be an expert on all the environmental issues. Yet teachers sometimes feel pressured to teach young students on topics about which even experts disagree. Elementary education teachers need

to resist this pressure and concentrate on science-based nature education. Love of nature will motivate children and help them absorb established scientific facts. Older students can begin to tackle the controversial subjects, and educators should encourage them to seek out additional sources of information.

Teachers who want to better understand the trade-offs involved in environmental choices should consider obtaining some economics training. The Foundation for Teaching Economics (at www.fte.org) sponsors teacher workshops around the country that introduce economic concepts, many of them using environmental and pollution-related topics.

Parents

Parents sounded the initial alarm about distorted environmental education. Parents should be alert to what their children are learning and become aware of alternative books and videos that offer more balanced information. If environmental education begins to resemble indoctrination, parents should be prepared to inform teachers about different viewpoints. Many teachers are unaware that these perspectives even exist and have no idea about their scientific support.

Sometimes schools bring in speakers who represent a narrow viewpoint. If this is the case, parents can encourage their schools to invite speakers with differing views. These might include representatives of a local land trust or environmental organization actually working in the field, rather than the more typical environmental spokesperson promoting political action.

Education, of course, begins with oneself. It is imperative that parents be skeptical about environmental "crises." They should recognize that an event or problem becomes "news" because it has an element of sensationalism, but that sensationalism may not be supported by the facts. There is an adage (sometimes attributed to Mark Twain) that reminds us, "It isn't what you know that get's you into trouble; it's what you know that ain't so."

Business Executives

Business leaders have many strikes against them when they attempt to enter into the world of environmental education. Some companies produce manuals

stressing their environmental awareness (forest products firms point out that trees are a renewable resource, for example). Others feature the efforts they are making to remove waste from their production processes or to recycle their products or product packaging. Frequently, environmental advocates attack such company literature, often for trivial reasons. A brochure by Shell Oil Company was criticized for promoting the joys of driving; a Dow Chemical video was criticized for “promoting the idea that everything is ‘made up of chemicals’ (thereby implying that all chemicals are natural and safe)” (Manilov and Schwarz). Instructional materials produced by businesses are looked upon with a jaundiced eye.

Although the criticisms of these materials are often unfair, Karl Kamena, who was Director of Government Affairs and Public Issues for Dow Plastics during the 1980s, admits that sometimes the companies went too far in trying to convey a positive image. “What do you do when school children are demanding the removal of your products and your customers’ products from restaurant counters and grocery shelves? You do just about anything,” he says (Kamena 1997, 7). In Kamena’s view, some of those initiatives were legitimate, but others were propaganda. “Environmental education in K-12 schools should not be driven by issues management, whatever the position. Education is not advocacy” (Kamena 1997, 7).

School Board Members and Other Elected Officials

Members of school boards must respond to many pressures from special interests while tackling problems ranging from ensuring adequate budgets to keeping the schools safe. Like other elected officials, they cannot get into the details of what is being taught in every classroom. At the same time, they should be skeptical of special interests, including well-intentioned environmental advocates who may hijack traditional educational goals. School board members and other officials should make explicit their expectation that school administrators meet a high standard of fairness and balance in all materials, including environmental materials.

Environmental Advocates

Most Americans rightly consider themselves “environmentalists.” They want natural areas to be conserved and the environment to be clean and healthy for humans and other living things.

Environmental advocates are more focused on carrying out activities to achieve these goals. They should recognize that the cause of environmentalism is hurt by poor education, by exaggeration, by excessive pessimism, and by overemphasis on action. As is evident from the conclusion of the Council on Environmental Literacy’s finding that the field of environmental education has become “needlessly controversial,” this reality is not always accepted (ICEE, 3).

Environmentalists themselves should be skeptical of what they read and should be aware of alternative interpretations of environmental conditions. Magazines published by environmental groups can be misleading, and the fund-raising literature can out-propagandize business offerings. For example, the National Audubon Society once wrote in a fund raising brochure: “We can project with some accuracy the eventual end of the natural world as we know it. That is, no trees. No wildlife. Climate changes so radical the tropics have migrated to the North Pole” (Beyea 1994). Such a ludicrous claim should be outside the bounds of acceptable environmental communication. Environmental advocates who want the respect of the American people should be wary of apocalyptic statements that have little grounding in fact.

Conclusion

In summary, America’s classrooms sometimes provide a forum for distorted views of environmental problems, but there are bright spots as well. All those involved in education, from kindergarten to the graduate level, should be concerned about the distortions. Those directly involved in environmental education, whether as teachers, school board members, parents, or students, should look for ways to improve on this process. Fortunately, a growing number of balanced and accurate resources are being produced that can make environmental education a valued part of growing up in America.

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