

Teaching Through Modeling: Four Schools' Experiences in Sustainability Education

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ABSTRACT: In this article, the authors examine how 4 innovative secondary schools model sustainable practices to their students. During school visits, the authors conducted interviews, observed daily life, and reviewed school documents. They found that modeling is a valuable approach to sustainability education, promoting both learning about sustainability and adoption of sustainable behaviors in these schools. The 4 primary means by which the schools model sustainability are individual role models, school facilities and operations, school governance, and school culture. Other schools interested in sustainability education will likely find these approaches to modeling useful.

KEY WORDS: education for sustainability, modeling, sustainability education, sustainable schools

An increasing number of secondary schools in North America are seeking to teach students to understand and respond to complex environmental and social issues (Sitarz, 1998; Sterling, 2001). However, most schools provide few role models, individual or institutional, from which students can observe and learn more sustainable behaviors (Green Schools Initiative, 2006). In this article, we describe the efforts of four innovative secondary schools in North America that are modeling sustainability to their students. For schools, modeling sustainability appears to be one effective way to achieve the goals of sustainability education (SE).

In the case of SE, where educators hope that students will not only understand sustainability concepts,¹ but also incorporate them into their behaviors, modeling can play a particularly important role. Although many K-12 schools address sustainability themes in their curricula and extracurricu-

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lar activities, the sustainability concepts being taught sometimes conflict with unsustainable behaviors that the schools model to their students.² Inconsistency between teachings and practice has confused students (Berryman & Breighner, 1994) and decreased both the likelihood of emulation (Bandura, 1986) and educational effectiveness (Pintrich & Schunk, 2002). Although advice is available to schools on incorporating sustainability into their curriculum and on greening their facilities (Cloud Institute for Sustainability Education, 2006; EcoSchools, 2006; Green Schools Initiative, 2006; McKeown, 2002), there is limited concrete guidance on how to shape an entire school community that models sustainability through its systems and actions.³ In this article, we address this need by sharing insights from case study investigations of four secondary schools modeling the principles and practices of sustainability.

Characterized by its combination of content, methods, and intended learner outcomes, the aim of SE is to help students understand and respond to complex environmental, social, and economic issues in a way that promotes sustainable living. SE learners explore the three Es of sustainability—equity, environment, and economy—and the interactions among these (Hesselink, van Kempen, & Wals, 2000; Sterling, 2001; Tilbury, 1995; Viederman, 1996) through methods that are interdisciplinary, learner-centered, experiential, and based on confronting real-life issues (Hesselink et al., 2000).

Researches have shown that modeling can be an effective way to teach knowledge, skills, and behaviors, motivate students to learn, and help them develop values (Cangemi & Kahn, 1979; Frayer & Klausmeier, 1972; Pintrich & Schunk, 2002). Researchers have investigated the effects of modeling on learning and behavior and have shown that models can considerably shorten and improve learning and imitative behavior, particularly when students are exposed to multiple models (Schunk, Hanson, & Cox, 1987). In schools, modeling through facilities, governance, individual behavior patterns, and culture occurs throughout the entire day and can strongly impact students' thoughts and actions. We focus on both human role models and on institutional models, whereby the set up of a system or facility reflects the values of its creators.

Method

In our qualitative study we conducted observations, interviews, and document reviews at four secondary schools, diverse in size, clientele, location, and structure (see Table 1). We selected these schools because they are leaders in the design and implementation of SE efforts. The results presented here originate from a broader study in which we examined how four secondary schools (Arthur Morgan School, Common Ground School, The Island School, and Lakeside School) implemented SE, the impacts their efforts had on students, and the challenges they faced (McMillan & Higgs, 2003). The purpose of the original study was not to explore the ways in which these schools model SE. However, the importance of modeling emerged as a primary theme.

Case Selection

We originally considered 18 schools in the United States, Caribbean, and Central America for the study. We identified these schools through a review of the SE literature, word-of-mouth, the snowball approach (i.e., asking representatives at each school we identified if they knew of other schools with similar programs), and an Internet search using keywords, including high school, sustainability, sustainable, environmental, social, community-based, and green school. Before inviting schools to participate in the study, we conducted informational phone interviews with an administrator or admissions officer at each school. These interviews allowed us to better assess the scope of the schools' SE efforts beyond the information available through their Web sites and published materials, which we also carefully reviewed. We chose the four schools that appeared to have the strongest focus on the

three Es in their academics, extracurricular activities, facilities, governance, and culture for further investigation.

Data collection. After receiving approval of the research methods and content from the University of Michigan's institutional review board, we spent 2 to 4 days at each school interviewing faculty, administrators, students, and staff about the content, structure, challenges, and impacts of the school's SE efforts. With participants' permission, we tape-recorded and transcribed approximately 50 hrs of semi-structured interviews. Although the schools gave written permission to identify their institutions by name, we assured all interviewees anonymity. In addition to interviews, we also observed meetings, facilities, and daily life and activities at the schools. We reviewed relevant documents (e.g., school newspapers, planning documents, program reviews, statements of purpose, curriculum descriptions, project proposals, public speeches, articles) whenever available.

Analysis. In the original study, we did not aim to evaluate the schools. Instead, we intended to describe how the schools were teaching sustainability, the challenges they have faced, and some of their impacts on students. SE literature guided the research questions, shaped the data collection, and helped create a framework for organizing data. This framework included a matrix, in which we entered data under one or more of 10 categories. Four of these overarching categories were based on the guiding research questions (i.e., methods schools use to implement SE, what works well in school SE initiatives, what does not work well, and the impacts these programs have on students). The other six categories were (a) environment, (b) economics, (c) social equity, (d) well being, (e) systems thinking, and (f) long term vision.⁴ According to SE experts, SE aims to provide learners with opportunities to develop knowledge, skills, values, behaviors, and mindsets related to these six areas (Cloud & Byrne, 2003; Hesselink et al. 2000; Tilbury, 1995; Viederman, 1996). We derived these six goals from a review of the literature on sustainability and SE; they were not necessarily the goals articulated by the four schools in this study.

Analysis consisted of an iterative progression of investigating evidence, modifying hypotheses, and reexamining evidence in light of the new hypothesis. In reviewing the data, we identified the recurring concepts as well as the unusual or particularly insightful comments and observations. We organized these concepts into the following themes: (a) how schools implement SE, (b) impacts SE programs have on students, (c) challenges these schools face, and (d) recommendations for other schools. The theme of modeling sustainability arose consistently in each of these categories.

Results and Discussion

The schools in this study modeled sustainability through four primary means: individual role models, school facilities and operations, school governance, and school culture. For each of the four means, we describe how the study schools use the means to model sustainability and discuss educational benefits of this modeling.

Individual Role Models

Perhaps the most obvious modeling technique we observed was that of an individual's role-modeling behaviors that promote sustainability. Behaviors engaged in by teachers and staff included (a) driving a hybrid car, carpooling, biking, or walking to school; (b) eating organic, local food with minimal disposable packaging; (c) wearing second hand clothes; (d) participating in community service; (e) composting, recycling, and reusing; (f) picking up litter; (g) turning off lights when leaving a room; (h) promoting democratic, equitable classroom environ-

TABLE 1. Demographic Overview of the Schools Participating in the Study

Characteristic	The Island School	Arthur Morgan School
Location	A minimally-developed area on the coast of Eleuthera, an island in the Bahamas	Black mountains of North Carolina, rural setting near town of Celo
Students attending (<i>N</i>)	40	25
Residential or day	Residential	Residential and day
Grades served	10–11	7–9
Private or public	Private; semester program	Private; low tuition and low budget
Student background	Students are mostly from upper-middle class United States families (different states); are motivated and interested in conservation. One of the students is from the Bahamas	Students are local and from parts of the United States. Many are from middle and working-class progressive families interested in alternative education
Financial aid	Need blind admissions (30% students on scholarships)	65% of students on scholarships
Philosophical emphasis	Place-based, teamwork, pushing students mentally and physically	Simple living, nonviolence, Quaker beliefs, social equity, cooperation
Pedagogical focus	Academically rigorous, somewhat experiential, mainly teacher-led, but participatory	Highly experiential and student-centered; students help decide class content

^aBerkeley High School has several small schools to allow groups of teachers and students within the larger school to create more intimate learning communities.

ments; (i) using appropriate conflict-resolution strategies; and (j) encouraging diverse and divergent opinions. Although teachers did not always engage in these behaviors exclusively for the purpose of modeling sustainability, their actions nevertheless served as models for students. Research supports the effectiveness of teachers as models because most students tend to pay attention to their teachers (Pintrich & Schunk, 2002), and they generally view teachers as competent (Schunk, 1987), two factors that have been shown to improve observational learning in many cases.

Furthermore, it appears that in the four study schools, sustainability role modeling was not unidirectional. In addition to teachers serving as models, observations and interviews from our study reveal that nearly everyone at these schools could serve as a model for anyone else. For example, observations revealed students modeling sustainable practices to other students, teachers modeling for other teachers, and students even modeling to teachers. Many examples of such modeling seemed unin-

Common Ground School	Lakeside School
Was on the campus of Berkeley Public High School, in urban Berkeley, California; the school has closed down	Suburbs of Seattle, Washington
400 in Common Ground; 3,200 in Berkeley High School	500 in upper school
Day	Day
9–12	9–12 in upper school
Public; small school within Berkeley High ^a	Private
Students all live in Berkeley. Student body is highly diverse racially (55% students of color), ethnically, philosophically, and socioeconomically (17% of students are economically disadvantaged)	Students are mostly from upper-middle class to upper-class families. Most are achievement oriented (99% of graduates attend college; 34% students are of color)
Public school (financial aid available for students to participate in trips and extracurricular activities)	22% of students on scholarships
Social and environmental justice, advocacy, activism, community-building	Academic excellence, leadership, social responsibility
Many student-centered classes, some advocacy-based; emphasis on ethics	Rigorous academics, multicultural curriculum, global sustainability

tentional (e.g., an ecologically minded student picking trash out of the recycling bin out of habit). Such modeling is sometimes intentional, as well. One student at Common Ground explained that she is sometimes motivated to perform sustainable behaviors because she wants other students and teachers to emulate her.

Researchers suggest that nurturance and perceived similarity to the learner are 2 of the strongest predictors of modeling success (Bandura & Houston, 1961; Frayer & Klausmeier, 1972; Pintrich & Schunk, 2002). Students are more likely to imitate a role model who is warm, affectionate, and perceived as similar to themselves in some ways. The close student–teacher relationships that were the norm at three of the study schools demonstrated this nurturance, warmth, and affection. At Arthur Morgan, Common Ground, and the Island School, numerous students we interviewed claimed that teachers were their friends and mentors, and several even equated them with parents. At these schools, most students called teachers by their first names and many spent informal time outside of

class talking, playing, and relaxing with them. Generally, student-teacher relationships at Lakeside were more traditional compared with the other three schools.

At Arthur Morgan School, the Island School, and Common Ground School, the tight relationships between students and teachers appeared to have a strong influence on the effectiveness of individual role modeling. Teachers and students spoke of how these relationships benefit their sustainability modeling efforts:

When I get the kids comfortable, they open up, and you're able to address so much more, as opposed to a group of kids who don't trust you—they'd close up, or ignore you, they wouldn't see you as a role model. (Common Ground teacher)

One thing I've learned working here is how incredibly powerful modeling is as a teaching tool. . . . It is the way that I teach the most. . . . The relationships we have with kids are so strong, which makes it easier. When they see us passionate about something, it gets them so excited And they really watch our behaviors to see if they're in line with what we say. (Arthur Morgan teacher)

The fact that we're so close with our teachers does facilitate conversation . . . about sustainability, the future, and how we should live our lives. (Common Ground student)

It is important to note that not all teachers at these schools necessarily model behaviors or attitudes supportive of sustainability, yet these teachers may form equally close relationships with students. Thus, carrying out sustainable behaviors is a necessary precondition to effective sustainability modeling, while close student-faculty relationships appear to improve the outcome of sustainability role modeling.

Facilities and Operations

These schools also demonstrate how campus facilities and operations can serve as powerful tools to teach students about sustainability. The schools have made significant efforts to decrease the negative environmental impacts and increase the positive social impacts of their institutions through the construction, maintenance, and operation of their facilities. The Island School is an impressive model for others in its efforts to create green school facilities. The efforts include: (a) creating its own energy with 150 photovoltaic panels, six solar hot-water heaters, and a wind generator; (b) establishing a wetland garden that naturally processes all waste water, including human waste (c) collecting and storing rainwater from roofs and instituting minimal water consumption, such as a navy shower, where the bather wets down, turns off the water, soaps up, then rinses off; (d) enabling passive cooling of buildings using indoor plants and underground water piped through walls; and (e) creating an experimental building made of wood from invasive trees and reclaimed materials.

Operations refer to the work done to keep the schools' physical systems functioning, including facilities maintenance, grounds work, waste management, cooking, and cleaning. It is interesting that the students and teachers at the Island School and Arthur Morgan School are in charge of school operations. Neither school employs custodial staff. Instead, the students and faculty serve as school caretakers, cleaning, collecting trash, recycling, tending gardens, composting, preparing food, and caring for school animals. Students at both schools are responsible for about 30 min of chores per day, as well as longer work projects that involve ongoing maintenance, building construction, and gardening.

The most common reason cited by school leaders to green their facilities and operations was to model sustainability to students. The educational value of this kind of modeling is apparent to some students as well, as articulated by one Island School student:

This place has done an incredible job educating me about sustainability. . . . This education is not necessarily from sitting down taking notes—it's the fact that we take navy showers, that our waste creates beautiful gardens, that our water supply depends on what nature gives us—living with nature is what we're taught. And all these things are amazing teaching tools.

According to David Orr, "buildings have their own hidden curriculum that teaches as effectively as any course taught in them. . . . We have not thought of academic buildings as pedagogical, but they are." (1994, pp. 113–114). Transparency in the school's efforts and operations is essential to making the facilities effective teaching tools. The Island School ensures that the ecological, social, and economic impacts of the facilities and operations (both positive and negative) are obvious to students and others. For example, the library displays monitoring panels that track the school's power generation and consumption throughout the day, and students measure and announce stored water levels and daily usage rates.

At Lakeside, rather than describing greening efforts as teaching tools, several interviewees described them as a way to make their words and actions more consistent. Interviews and observations revealed that most of Lakeside's greening efforts were not very transparent. Although facilities and food services staff explained dozens of greening efforts that we implemented, students whom we asked about these efforts, even members of the Earth Corps club, were able to mention only a few. Furthermore, none of the Lakeside students interviewed mentioned green facilities as a primary way they learn about sustainability. The differing motives for greening may help explain why these efforts are less transparent to students.

In addition to making green facilities transparent, some of the study schools also work to make their operations transparent to students. Involving students in the operations of the school makes the waste, consumption, inequities, governance, and economics of the school more visible and tangible. A teacher at Arthur Morgan School explained how student work projects increase transparency:

Work projects make [students] more involved with their environment—where their resources come from and where their waste goes. . . . There is a natural tendency to become aware of how your life impacts the place that you live and the land that you're on since we are the ones who mow the lawn and clean out the septic system.

When a school's staff works toward making its facilities and operations both sustainable and transparent, with environmental considerations evident to students, an educator's burden is partially lifted. One benefit of green facilities and operations is that they can help students learn about sustainability via osmosis. As one Island School faculty member described:

We use the facilities as implicit teaching tools more than explicit teaching tools, and sometimes the effects of that implicit teaching [are] deeper. . . . Providing the infrastructure as a teaching tool is difficult, but it works for you every day. It works subtly, physically . . . and teaches them implicitly. . . . It's like osmosis.

An Island School administrator explained that facilities and operations can get the same messages across to students that teachers do, but without proselytizing, which is an important benefit of implicit teaching.

Several interviewees also reported that transparent green facilities and student involvement in operations act as catalysts for student discussions about sustainability and give students opportunities to try new, sustainable behaviors. This resulted in some teachers feeling less need to lecture on sustain-

ability issues because the students were initiating the conversations. Several interviewees at both schools also reported that their involvement in operations made them feel more ownership and responsibility for their local place and school.

Sustainable facilities and operations thus promote SE by modeling sustainable practices, reducing the need to preach to students, creating a context for conversations about sustainability, providing hands-on opportunities to try sustainable practices, and increasing student ownership and stewardship of their environment.

Governance

Although the staff of the participating schools appeared to use school facilities primarily to model the environmental and economic sustainability goals of SE, they used school governance to model social equity. Arthur Morgan School and Common Ground School used school governance structures as a means of modeling social equity and civic participation. Students at these schools learn about social equity through the modeling of participatory processes that give students and faculty power to influence school decisions.

The governance of Arthur Morgan School is nonhierarchical. There is no head of the school, and all employees hold equal status and decision-making power and earn the same salary. The staff and students make school decisions at weekly all-school meetings. In these meetings, and in Board of Trustees and faculty meetings, the school uses consensus-based decision making.

Common Ground, a small school within a large public school, lacked a formal school governance structure beyond that of the overarching Berkeley High administration. Governance within Common Ground was quite informal. The school founders held school leadership roles in addition to heavy teaching loads. A core group of students was deeply involved with designing the small school and some continued to play a strong role in school governance. Initially, some students participated in faculty meetings and made up over half of the school's design group. However, one faculty member estimated that although approximately one-half to one-third of students at Common Ground were actively engaged with school decision making and sustainability issues, the others remained somewhat less engaged. Furthermore, although opportunities for meaningful student participation in decision making were high within Common Ground, several students and faculty members interviewed were frustrated with the lack of opportunities for participation in district level decision-making processes. One student gave the following account:

Lots of students went to City Hall to ask not to have double periods taken away. We were basically laughed at. . . . [They] looked down on us and didn't hear anything we said.

The shared decision-making power within Common Ground contrasted with what several interviewees described as a frustrating lack of decision-making power within and support from the overarching Berkeley High School administration and the district administration. These were major barriers that eventually led the school to close after this research was complete. School founders intended to reopen as a charter school.

Nevertheless, at Common Ground and Arthur Morgan School, the level of student influence on within-school decisions gave them the freedom to take on projects such as bringing in guest speakers, organizing and fundraising for clubs, building gardens, teaching classes, and advocating for themselves in the district administration. By including students in the school decision-making structures and by modeling inclusive practices, students both learn how the systems are structured and develop skills that allow them to participate effectively within these structures. Although U. S. public schools laud the principles of democracy and equality, most do little to model democratic leadership in their own governance, an approach advocated by many (Apple & Beane, 1995; Levin, 1998; Wallin, 2003).

In addition to modeling inclusive decision-making processes, the governance structures at these schools also tend to empower students and help them build ownership of their education (McMillan & Higgs, 2003). Many Arthur Morgan School students and teachers we interviewed reported modeling equity and building student ownership through their use of consensus. One faculty member described the consensus-based system as, "the core and foundation of the social equity base of the school." Another teacher noted the impact it has on students:

The [consensus-based] system takes time and responsibility, but it pays off in unity and it models incredible equality to students. It's nonhierarchical, values everyone's opinions . . . and is very inclusive. . . . Students have a good sense of empowerment here.

Arthur Morgan School students have a voice in nearly all school decisions—student admissions, faculty hiring and firing, courses offered, and trips taken. Students interviewed valued the power they had to influence the school, as articulated by one student:

Basically, student opinion affects everything around here. We do lots of the decision making. We can try to change the rules if we want, and we get to help hire staff. . . . And when you bring your ideas to all-school meeting or to a staff member, they'll take it seriously.

The participatory governance structures at these schools appear to increase student ownership of their education. Part of this ownership stems from the input that students have into the content of their education. One student said, "It's so cool, how at Common Ground, we get to decide what we want to learn." An Arthur Morgan student had similar sentiments, saying, "Before the new class term begins, the teachers ask us what we want to learn, what classes and electives we want offered, and then they actually take our advice."

One of the goals of SE is to prepare students to participate in a democratic society (Hopkins & McKeown, 1999, p. 3) in part by confronting real-life issues. Modeling these democratic processes not only appears to empower some students to get involved with the decisions in their school communities, but also builds the skills needed to be active citizens.

While Common Ground and Arthur Morgan School model highly decentralized, egalitarian systems of governance, the authors speculate that schools can model social equity through a more traditional, hierarchical governance system too, as long as there is some transparency and democracy. Governance systems like that of Arthur Morgan and Common Ground are likely to be problematic and less realistic in a large school, where the scale may necessitate some hierarchy for productivity and efficiency. Research suggests that people mainly want opportunities for their voices to be heard, and do not necessarily want to be in control (Kaplan & Kaplan, 1982). It seems, therefore, that radical transformation of school governance may not be necessary for SE if effective systems are created to make student and faculty voices heard.

School Culture

The strong influence that culture has on people's actions, thoughts, and feelings makes it a powerful teaching tool. Culture is a pattern of shared assumptions, values, beliefs, and norms of behavior that is considered valid and is taught to new members of a group (Schein, 1985). School culture is manifested through the school's rituals, traditions, buildings, programs, instructional methods, and extracurricular activities (Stine, 2000). Faculty and administrators at the schools identified school culture and broader societal culture as important to the messages students receive about sustainability. Although a school may be unable to change the culture in which students are immersed outside of school (in the short term, at least), schools can work to

make their own cultures supportive of sustainability. For example, one Arthur Morgan School administrator said:

The school has a tradition behind it of . . . creating a culture that can live with the environment more sustainably . . . it is this unconscious asset that we have. . . . It can be hard to maintain what we think of as a sustainable culture—especially hard if you have too much contact with the mainstream culture. For us, our isolation from mainstream society supports sustainability.

School culture at Common Ground expected members to question mainstream norms and practices, particularly regarding materialism, power structures, and social and environmental justice. These cultural norms were manifest in the school's mission to teach about environmental and social justice.

Literature suggests that traditions, rituals, and ceremonies are effective ways to establish and embed culture into an institution (Stine, 2000; Peterson, 1996). Several rituals and traditions at Arthur Morgan School support sustainability. Every morning, all students and staff gather in their commons room for morning sing. Many songs have themes related to the environment, simple living, personal growth, community, and social justice. To choose prom dates, everyone draws someone else's name out of a hat, and refusals are unacceptable. On prom night, the community raids the theater costume room and emerges in outlandish garb ready to dance. This prom models both social inclusiveness and nonmaterialism.

The Island School also fosters a culture of sustainability through traditions. Every morning, all students, teachers, and administrators head outdoors for an hour of intense morning exercise. A typical day involved running 5 miles to various stations, where students moved like marine species, practiced yoga, swam in the ocean, and simultaneously received minilessons on ecological zonation. At the end of the semester, all students and staff participate in a half marathon. This ritual promotes teamwork, perseverance, and connection to the natural world. By embedding the values of sustainability in their way of thinking and functioning throughout the day and year, teachers and students at Island support sustainability.

For Arthur Morgan School and the Island School, establishing prosustainability cultural norms takes advantage of the natural human desire to want to feel accepted by one's peers. Adolescents' desire to find acceptance within their peer group is particularly high (Newman & Newman, 2001). Thus, creating cultural norms consistent with sustainability is likely to help schools further their SE goals.

By creating prosustainability cultures, these schools are offering students an alternative cultural model to the one they probably experience outside of school. The norms and values that promote unsustainable practices are so deeply embedded in North American culture that it may be difficult to imagine the details of a more sustainable world. Culture, once established, is not easy to shift (Schein, 1985). A culture that is unsupportive of sustainability can thus present genuine challenges to SE, as illustrated by the case of Lakeside.

Lakeside has been working consistently for more than 10 years to develop and integrate sustainability into the school's mission, curriculum, and facilities, mainly driven by a small group of committed faculty and staff. However, compared with other schools, it was obvious that Lakeside's sustainability efforts, in general, were less well received by the student body.⁵ The relatively few Lakeside students who were highly interested in sustainability were frustrated with their peers. One student described the general attitude of the student body towards sustainability as "a sea of apathy." Numerous faculty and staff mentioned this lack of interest among students, and several noted that frequent eye rolling often accompanies sustainability related discussions.

Perhaps the most significant barrier to Lakeside's SE efforts was their school culture. Although two administrators felt that sustainability pervades school thinking and decision making, the great major-

ity of interviewees thought the school's culture was out-of-sync with its sustainability goals. Several interviewees suggested that the dominant Lakeside definition of success does not support sustainability. One Lakeside administrator described the school's definition of success as a key resource that needs redirecting:

The definition of success is a huge resource here. And right now that resource is being used on college preparatory education, SAT scores, AP scores . . . that's the coin of the realm. . . . If we were able to co-opt that resource and make the coin of the realm awareness, critical thought, social-ethical development, or ethically compatible behavior . . . those are the resources we need. . . . That's a huge cultural shift, and it's not an easy one.

This does not mean that academic achievement and a drive to excel are at odds with SE. The Island School, where serious academic achievement and sustainability go hand-in-hand, demonstrates that this is not the case. This may be partly because the Island School, as a semester program, has the luxury of focusing heavily on sustainability, and does not offer a wide range of courses or time-consuming extracurricular activities. Lakeside, conversely, has many more offerings and requirements, as well as what was described by some as a culture of busyness. One Lakeside teacher explained that the number of responsibilities people have prevent them from focusing on SE. Similarly, one Lakeside student said:

We all say we have 2 sports to play, 5 classes, and we have to get into Harvard. People can't take the time to take the caps off bottles or recycle paper.

During the 2002–2003 academic year, over 4,000 pieces of silverware, along with hundreds of ceramic plates and glasses, reportedly disappeared from the Lakeside cafeteria, despite signs in the school cafeteria and announcements urging students not to dispose of them. Several interviewees explained that some students throw away the silverware, plates, and glasses because they feel they do not have time to return them.

Another cultural element that all the schools contend with in some way is the dominant culture of consumption in the United States. A Lakeside teacher described this, saying:

The students' consumer mentality is unbelievable. They drive here in their SUVs, live in 4,000 square foot homes, and then recycle a can. In general, the kids don't see any care for the earth modeled for them. It is hard to make them see a different way of thinking when the pressure from home and peers is to do the opposite.

Although a school may not actively promote overconsumption within its own walls, failing to actively discourage it may be a case of the null curriculum (or null culture) working against sustainability goals. Culture can be defined as much by what a school does not include in its culture as what it does. Some of the participants in the study built cultures at their schools that deliberately step away from consumption. For example, Arthur Morgan School's culture of simple living is manifest in their humble buildings and rustic grounds. This would be unacceptable at schools like Lakeside, where the immaculate, state-of-the-art facilities are an important part of their identity.

Establishing a school culture that supports SE can be an enormous challenge, and schools should be aware of the ways in which their culture may inhibit their SE efforts. However, the effects of a successful cultural shift can be invaluable to SE efforts. Culture's pervasiveness and widespread acceptance within a community may make it one of the strongest ways to encourage and model the goals of SE to all members of a community. In addition, a culture supportive of SE is more likely to

promote modeling using the other means we have described, because individual behavior, facilities and operations, and school governance may, in themselves, express the cultural norms at a school.

Implications

It appears that modeling allows schools to foster learning about sustainability and the adoption of sustainable behaviors without the need to preach or proselytize, thus avoiding the problems associated with overt advocacy. If students learn through direct and continual observation that the people and institutions they respect engage in sustainable practices, rather than simply being told of their value, they may be more likely to adopt such behaviors.

Modeling can help students transfer the concepts of sustainability from abstract ideas to personal and tangible applications. Direct observation of sustainable practices equips students with the knowledge needed to carry out the behaviors themselves. One can expect that students who have seen sustainable practices being carried out firsthand will be better prepared to lead more sustainable lifestyles.

Schools interested in implementing SE should be aware of the school and community characteristics that facilitate or inhibit effective modeling of sustainability. First, size matters. It is clearly easier to successfully model sustainability to a school of 25 students, like Arthur Morgan, than a school of 500, like Lakeside. Second, residential schools, where the students reside in dormitories on campus, such as the Island School and Arthur Morgan, have an edge over day schools because they can provide a more consistent environment and more hours of exposure to the concepts and practices of sustainability. Third, a degree of separation from mainstream culture can be helpful. Both the Island School and Arthur Morgan School are physically isolated from surrounding communities, giving them even more control over the external influences on students. Another advantage is the ability to attract students expressly interested in sustainability. This is not as simple as the distinction between public and private schools, because some public schools are schools of choice (e.g., charter schools, magnet schools, small schools within larger public schools, like Common Ground). Furthermore, Lakeside is a private school, but families choose Lakeside primarily because of its excellent academics, not typically because of its sustainability efforts, and thus the students and staff are not as attuned to sustainability from the start. Finally, communities that place high value on environmental quality and social equity are likely to be easier places for consistent modeling of sustainability. Though Common Ground was a large, highly diverse, public day school, it had the advantage of being in Berkeley, California, a city with a strong history of environmental and social activism, which likely contributed to its success.

Socioeconomic class may also facilitate or inhibit SE efforts, because more funding facilitates greening of facilities (e.g., serving organic foods, supporting clubs and field trips, bringing in guest speakers). However, our study results reveal that the prevalent culture in some affluent schools, like Lakeside, was a clear obstacle for effective sustainability modeling. Overall, there was no clear positive or negative link between class and response to SE in this study. Common Ground, Arthur Morgan, and the Island School all modeled sustainability effectively despite having different levels of socioeconomic diversity within each school and student bodies of different average socioeconomic backgrounds overall.

The fact that three of the schools participating in the study possessed some of the previously mentioned facilitating characteristics does not make the lessons irrelevant to schools without such advantages. We expressly chose schools that seemed to be models of SE. It makes sense that these schools are likely to have inherent characteristics that favor SE. However, the widespread success of SE is profoundly dependent on the field's transferability to diverse contexts. Although it is more difficult to model sustainability in a more typical American school, the lessons from these four schools should be

equally applicable. The principal methods through which sustainability can be modeled are likely to be relevant to almost any school interested in modeling sustainability. Furthermore, the advantages mentioned are features that make it easier to effectively model sustainability. They alone do not determine the success of sustainability modeling efforts.

The one school that had none of the facilitating characteristics mentioned was Lakeside. Lakeside's challenges are not entirely attributable to the fact that it is a large day school not founded on sustainability principles. There are many ways that Lakeside can more effectively model sustainability given its circumstances. By encouraging closer student-teacher relationships, Lakeside can improve the effectiveness of sustainability role modeling between teachers and students. By making the facility greening efforts transparent and visible to students, Lakeside teachers can use them as teaching tools and students may perceive the administration as more sincere about its support for sustainability. Furthermore, Lakeside could use its governance structures to model sustainability to students, by opening faculty meetings to students and finding ways to give them meaningful decision-making power. Regarding the cultural challenge, those at Lakeside must take care not to alienate students, families, and supporters by shifting cultural norms too quickly. Instead, Lakeside may benefit from more traditions and norms that embed sustainability into the culture.

One possible explanation for the four schools' different levels of impact on students is the degree of congruence in the sustainability messages that students receive through the curriculum, individual role modeling, governance structure, facilities and operations, and school culture. Although the four schools had many similar elements in their programs, not all schools had all the elements. Where the Island School and Arthur Morgan School have approached SE from many different angles, Lakeside in particular has used fewer different approaches to educating for sustainability. However, all schools in this study can identify areas where they can improve their modeling efforts or make them more consistent. This research suggests that schools should try to consistently model the same messages about sustainability through many spheres of influence on students. If a school sends mixed messages, students and faculty may be less likely to take the school's efforts seriously, instead perceiving hypocrisy and perhaps even reacting negatively to what would otherwise be positive steps towards building an SE program. One principal means of achieving this consistency is through school culture, because it underlies and shapes behaviors in the individual, operational, and school governance areas. A cultural shift, promoted partly by traditions, rituals, and ceremonies, is thus likely to spark changes in other areas as well.

Taking full advantage of the modeling opportunities possible through individual role models, facilities and operations, governance, and school culture is an enormous task for a school. How, then, should a school prioritize its modeling efforts? One approach may be more effective than another for different schools, or for different goals of SE. For example, a school that recognizes the need to strengthen its emphasis on social equity may decide to focus on school governance, culture, and individual role models. In contrast, to model economic sustainability, a school might focus on facilities and operations.

The first step for a school interested in modeling sustainability is to become aware of what the school is currently modeling to students. All the spheres of influence on students can either support or undermine SE by modeling sustainable or unsustainable behaviors. Schools can conduct a self-assessment by looking at each of the four areas highlighted in this study and asking their students what messages they are receiving about sustainability from each area. Schools can then compare those messages to the sustainability messages being sent through more explicit means such as the curriculum. The SE congruence matrix developed by McMillan and Higgs (2003) is a useful self-assessment tool that schools can use to better understand where they may be sending consistent messages, conflicting messages, or no message at all to their students regarding sustainability.

Although talking about sustainability is far easier than practicing it, the benefits of modeling sustainability can be great—educationally, environmentally, economically, and socially. To shape a more sustainable world, young people need models of sustainability that they can emulate. The schools in our study provide insight into how to handle this challenge.

NOTES

1. For a description of the basic concepts and habits of mind of SE, see Cloud Institute For Sustainability Education (2006).
2. Several examples of behaviors that conflict with the sustainability message include maintaining facilities that demand high energy and material inputs and create excessive waste, a governance structure that allows for little meaningful decision making from students and staff, and a culture of overconsumption.
3. A useful report by Henderson and Tilbury (2004), documents several international whole-school SE programs.
4. For detailed descriptions of the research questions and the goals and content of SE, see McMillan and Higgs (2003).
5. For an in-depth description of the ways in which these schools' SE efforts impacted students, see McMillan and Higgs (2003).

ACKNOWLEDGMENT

The authors are grateful for assistance from their advisors, Dr. Michaela Zint, Dr. Rachel Kaplan, and Dr. Raymond DeYoung, who offered invaluable and extensive guidance, and critique. They thank individuals from Arthur Morgan School, the Island School, and Common Ground who shared their stories, and Beth Covitt, who provided helpful advice. They also appreciate Steve Higgs for his encouragement, support, and patience.

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James S. Denton Appointed as Executive Director of Heldref Publications

Ambassador Jeane J. Kirkpatrick, president of the Helen Dwight Reid Educational Foundation, has announced that James S. Denton has been appointed executive director and chief operating officer of Heldref Publications. "We are delighted and fortunate to have Mr. Denton join our team," said Ambassador Kirkpatrick, "and we are anxious to make use of his well-documented vision, leadership, and management expertise to help take the organization to new heights."

Denton previously served as executive director of Freedom House, where he restored fiscal solvency to the organization, dramatically increasing its budget and leading a massive expansion of its international programs and publishing operations. Subsequently, Denton worked as a communications consultant with clients including public broadcasting, several heads of government, and various cultural organizations and think tanks. He has written, edited, and published major works on human rights, democratic development, and terrorism.