

PLACE-BASED EDUCATION: CONNECTING CLASSROOMS AND COMMUNITIES

CLOSING THE ACHIEVEMENT GAP: THE SEER REPORT

by David Sobel

As research today is often required to validate innovative aspects of education, David Sobel's analysis of the SEER report makes quantitative sense of nature education and its ability to improve learning. Test scores increase, attendance surges, language arts assessments show richer self-expression, speaking skills gain a community cause, math engagement flourishes, and students do science and not just study science. Environmental education combined with service learning takes the school into a higher purpose and creates rich learning incentives.

The State Education and Environment Roundtable (SEER) is a cooperative endeavor of education agencies from sixteen states working to improve student learning by integrating the environment into K-12 curricula and school-reform efforts. To assess the value of these approaches, they identified model public school programs

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in twelve of the sixteen states and examined student behavior and performance on standardized tests at all these schools. Going into this study, people assumed that it would show increased academic performance in science, but everyone was surprised by the across-the-disciplines scope of the impact. In *Closing the Achievement Gap*, authors Lieberman and Hoody describe some of the results:

A recent study of 40 schools across the nation indicates that using the environment as an integrating context (EIC) in school curricula results in wide ranging, positive effects on student learning. The study found that EIC improves student achievement in social studies, science, language arts and math. Students, teachers and administrators also reported other significant effects including: development of problem solving, critical thinking and decision-making skills; increased enthusiasm and engagement in learning; and, gains in summative measures of educational achievement such as standardized test scores and grade point average. (Lieberman and Hoody, 1998)

It's interesting to look at some of the details of what's happening in these schools. For instance, what do they mean when they say "increased enthusiasm and engagement in learning?" One way to quantify this increase is to look at student attendance and disciplinary referrals. In nine studies comparing EIC students to students in traditional programs in the same school, EIC students demonstrate better behavior, attendance, and attitudes than traditional students.

In [Dallas,] Texas, for instance, in the first year of Hotchkiss Elementary's EIC programs, teachers made 560 disciplinary referrals to the office. The next year, as program implementation expanded, the number dropped to 160. The following year, with the EIC curriculum fully established, Hotchkiss administrators reported only 50 disciplinary referrals. Both the principal and teachers attribute these decreases in behavioral problems to students' increased engagement in learning. (Lieberman and Hoody, 1998)

At the Luke Falls High School in Little Falls, Minnesota, EIC students had 54 percent fewer suspensions than other ninth graders, and at Valley High School in Louisville, Kentucky, EIC students have an 11 percent higher rate of attendance than other students. We encountered a charming example of this in Littleton, New Hampshire, this past year. The physics teacher was teaching his unit on

mechanical advantage by involving students in the reconstruction of a neighborhood trail where they had to use pulleys, levers, and fulcrums to accomplish the task. On Senior Skip Day one of the students commented, "I want you to know, Mr. Church, that I skipped all the rest of my classes today, but I just couldn't miss this class. I'm too committed to what we're doing to skip this."

Quantifying attendance and behavior problems is a good way of getting at that elusive concept of motivation. Obviously, if students are more motivated, more committed to learning, then it's more likely that learning will sink in and take hold rather than evaporate. The comments from one seventh grade student at the Radnor Middle School in Wayne, Pennsylvania, make this clear.

I signed up for Watershed because I thought it would be easier. But let me tell you: it is a lot harder. It's fun in a way that it's harder. I actually want to learn now.... I just got awakened to the fact that I love school for the first time in seven years.

Last year, I didn't like school. I took forever to learn. Sometimes I turned in assignments late. But now I don't because I like the overall learning experience better.... Before I studied really hard for the test, did the test, probably got an A and then I forgot everything. Now stuff is actually interesting to learn and I know that I can use it later if I get it now. (Lieberman and Hoody, 1998)

It's not surprising that test scores increase as a function of increased enthusiasm for learning. For simplicity's sake, let's just look at language arts. Since reading scores seem to be the Holy Grail of educational reform, perhaps the EIC program can be one of the knights in shining armor. In the SEER study, seventeen comparisons of reading scores on standardized tests indicated that students in EIC programs outperform their peers in traditional programs. For instance, in Dallas at the Hotchkiss Elementary School, students showed significant increases in writing scores after the EIC programs were implemented.

The passing rates of fourth graders from the 1996-97 class, the first to learn through EIC approaches, surpassed by 13 percent those of students in the 1995-96 class. According to staff members in the Texas Education Agency's Division

of Student Assessment, Hotchkiss's gains were "extremely significant" when compared to the statewide average gain of one percent during the same period. (Lieberman and Hoody, 1998)

The improvements appear to span the spectrum of language-arts assessments. Students read with improved understanding, there's more variety in their writing genres, styles, and strategies, they connect and synthesize complex ideas more effectively, and they create a greater volume of higher quality work. Finally, students speak out with increased skill and confidence. In Greenwood Springs, Colorado, the Riverwatch program in the science department at the high school engaged students in studying the relationship between land use practices and water quality. When three Riverwatch students attended a community meeting, they



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got drawn into speaking about the importance of protecting the Colorado River corridor.

Impressed panelists encouraged the Glenwood students to apply for grant funds to implement their ideas. They did, and became the first team of high school students in their state to obtain a Greater Outdoor Colorado Grant. The city matched the state's funding and students ultimately received \$66,000 to plan and develop a riverside pocket park. (Lieberman and Hoody, 1998)

The students' articulate speaking skills, developed in part through participating in an EIC program, won them the respect of the city's leaders. And the challenge of writing a grant application was a real-world test of their writing skills. The SEER study is demonstrating that using the environment as an integrating context can improve test scores, enhance citizenship, *and* improve the quality of the local environment.

ENVIRONMENT-BASED EDUCATION: CREATING HIGH PERFORMANCE SCHOOLS AND STUDENTS

A study published in September 2000, commissioned by the National Environmental Education and Training Foundation (NEETF), echoes many of the findings of the SEER study. The study focused on five schools in Texas, North Carolina, and Wisconsin, a model school program involving five schools in Florida, and a statewide program in Kentucky. The schools had all chosen place-based education as a core instructional strategy. Many were in urban neighborhoods with diverse racial profiles and high percentages of students receiving free or reduced-price lunches. The introduction to the study says:

Since 1983, with the release of *A Nation at Risk*, Americans have been engaged in a journey toward creating more effective schools....The school reform movement is calling for well-educated individuals who have a deep and abiding knowledge of the world in which they live. Society is asking for citizens who are prepared to take active roles in their communities. Business is calling for "renaissance workers," workers skilled in the leadership competencies that will be required in the increasingly complex global environment....Environment-based education is a maturing

discipline well suited to achieving these goals. [Author's emphasis] (Glenn, 2000)

Standardized testing of students in the schools studied showed that:

- Reading scores improved, sometimes spectacularly.
- Math scores also improved.
- Students performed better in science and social studies.
- Students developed the ability to make connections and transfer their knowledge from familiar to unfamiliar contexts.
- Students learned to “do science” rather than just learn about science.
- Classroom discipline problems declined.
- Every student had the opportunity to learn at a higher level. (Numerous teachers in Kentucky indicated that students previously performing at low academic levels “came alive” when introduced to an environment-based curriculum.)

The Isaac Dickson Elementary School in Asheville, North Carolina, is a K-5 school in which 50 percent of the students come from low-income families. “Academic progress for our students is increasingly more challenging,” says Principal Vicki Deneen, “because of the poverty issues that consume families living in the projects.” Environmental education with a service-learning focus was implemented to help students meet the state learning standards. Teachers, students, community members, government agencies, and community organizations collaborated on three school-wide learning projects—a gardening and science club, the MAGIC program (Mountain Area Gardens in Community), which involved school and community gardening and food preparation, and the re-establishment of a schoolyard nature trail.

The results? “During the 1998-99 school year, students at Isaac Dickson Elementary improved their reading, math and writing skills as measured on state achievement tests. Overall, school achievement was exemplary, with actual growth 9.1 points above expected growth.”

Let’s look a little more closely at the math scores. From 1998 to 1999, the statewide math scores for fourth graders showed an increase of 15 percent in students scoring at the “proficient” level. The percentage of fourth graders at Dickson performing at the proficient level increased by 31 percent. Fifth graders statewide showed an increase of 3 percent while those at Dickson showed an increase of 14 percent and went from scoring slightly below the state average to well above. The study finds similar results in reading and math scores at the Hawley Environmental Elementary School in Milwaukee, Wisconsin—a school surrounded by city streets, with an asphalt playground and a student population of which 71 percent receive free or reduced-price lunch.

How about science and social studies? The Tompkinsville Elementary School in Tompkinsville, Kentucky, serves 630 rural students, also with a high percentage of students qualifying for the lunch program. Prior to 1995, science, reading, and social studies scores on the Kentucky Instructional Results Information system (KIRIS) assessment were low. Then, Tompkinsville got an outdoor

The students hadn’t just consumed a set of facts; they had developed a set of higher-order cognitive skills in observation, analysis, and problem solving that they could carry with them as tools to use in other settings. We want our students to test well, but what we want even more are students who, when they get dropped into new situations, can figure out how to approach a problem.

classroom. A group of teachers and community members built trails, observation decks, and an outdoor amphitheater; they also planted a garden. Concurrently, the teachers turned the curriculum out into the community. Principal Cecelia Stevens comments, “Our students might explore how logging affects the economy, look at the pros and cons, and visit local lumber mills.” Since 1995, the scores on the KIRIS assessment have risen consistently, with

an increase of 25 percent in science scores and 40 percent in social studies scores over four years. A more recent study, published in *Forum*, a publication of the Funder's Forum on Environment and Education, recounts the test scores for eighth graders on the Oregon Assessment Test from the Environmental Middle School (EMS) in Portland, Oregon. Over the past five years, teachers at this urban school have developed a curriculum built around rivers, mountains, and forests. "Tuesdays and Thursdays at EMS are dedicated to field studies restoration work and community service. Students plant native species, serve meals to the homeless, and sample the Willamette River, developing an exceptional knowledge of and attachment to their home" (Smith, 2001).

The percentage of EMS eighth graders meeting or exceeding state standards in reading/literature, mathematics, writing, and math problem solving has risen substantially above the state average in the past three years. One interesting statistic: Ninety-six percent of EMS eighth graders meets or exceed state standards for math problem solving, compared to only 65 percent of eighth graders at comparable middle schools.

The same kind of story appears to be emerging in Louisiana bayou country, about 30 miles northeast of Baton Rouge. East Feliciana Parish faces numerous challenges: "low income populations with a limited tax base, struggling resource-based economies, a shortage of certified teachers, a large proportion of students considered 'at risk' and few career opportunities for high school graduates hoping to stay in the area" (Null, 2002).

Concerned by low science test scores on state assessments and a lack of science background among teachers, superintendent Daisy Slan decided to try something new. Book learning and rote memorization weren't working, so with support from the Delta rural Systemic Initiative of the National Science Foundation and the Rural School and Community Trust, the district implemented Project Connect, a math and science professional development program with an emphasis on place-based education. In just the second full year of the program, students' performance on the Louisiana Educational Assessment Program (LEAP) improved significantly. "Although fourth grade students in East Feliciana's three elementary schools (Clinton, Jackson

and Slaughter) continued to rank below the overall state average in their scores taken as a whole, the number of students passing the science portion increased thirteen percent” (Null, 2002). In response to these hopeful indicators, superintendent Slan is planning to expand the place-based approaches across the curriculum.

Another measure of achievement is college acceptance rates. The Llano Grande Center at Edcouch-Elsa High School in southernmost Texas has been a Rural School and Community Trust site for almost a decade. In the tiny, mostly Hispanic towns in this area, 90 percent of the households have incomes of less than \$10,000 and 91 percent of parents lack a high school diploma. “Yet in the last decade, Edcouch-Elsa high School has sent 45 students to elite colleges and universities such as Stanford, Brown, Yale and Princeton while 65 percent go on to some form of higher education—well above national norms for Hispanic students” (Zibart, 2002).



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This litany of results may still not allay one of the concerns lurking in many readers' minds: "Well great, they perform well on tests, but can they *think*?" The Environmental Middle School results from Oregon suggest an answer, and the final case study of the NEETF study supports it. The case study was conducted at Condit Elementary School in Houston, Texas, by researcher Carol Basile. The school population comes from both sides of the tracks, according to Basile, and includes a representative mix of Hispanic, African, American, Caucasian, and Asian students. The school is considered a high-achieving school with strong parental and administrative support. Basile's study was about as controlled as you can get for this kind of educational research. She split a group of 45 third graders into two groups and taught one group traditionally and the other group using an environment-based approach. Her objective was to determine if the third graders could transfer their learning from the content covered to other contexts.

The traditional group experience classroom-based instruction (with the exception of one weekly nature walk and one field trip to a local nature center) to learn about habitat. The children read and discussed forest, prairie, wetland, and urban habitats. They learned about habitats through art projects, worksheets, and environmental activities that could be done in the classroom. None of the activities required any kind of systematic investigative process.

The experimental group used Nature at Your Doorstep, a skill-based curriculum based in the scientific method. In each investigation, students "became scientists" by reading about and researching topics such as habitat, biodiversity, trees, or food webs. They developed their own questions and collected their own data. They learned to analyze data by charting and graphing. Every week the students explored a new problem, i.e., they might try to find out whether trees can be habitats for some animal. Students worked outdoors three out of five days, and took one field trip to the local nature center. (Glenn, 2000)

Using a wide array of indicators, Basile found that while both groups were able to transfer their knowledge from the learning situation to a similar situation (referred to as *near transfer*), only the environment-based group of third graders could transfer their learning to a vastly different context (*far transfer*). In other words,

the students hadn't just consumed a set of facts; they had developed a set of higher-order cognitive skills in observation, analysis, and problem solving that they could carry with them as tools to use in other settings.

Of course, we want our students to test well, but what we want even more are students who, when they get dropped into new situations, can figure out how to approach a problem. We want them to ask: What resources are available, what do I already know, how can I get started, and who can I get to help me solve this? Both the SEER and NEETF studies suggest that community-based and place-based education successfully increase academic achievement *and* give students the skills to solve problems.

PLACE-BASED EDUCATION AND THE CULTIVATION OF STEWARDSHIP

All of the above sounds reasonably persuasive—unless you don't really think that academic performance is the true measure of program success. I was first exposed to this perspective in the course of a discussion about place-based education programs with Ted Smith, director of the Kendall Foundation in Boston, a well-known leader in environmental funding. When we talked about academic achievement, Ted kind of grimaced, "Well, test scores are all fine and good," he acknowledged, "but what I really want to know is if these programs help kids become better stewards of the land and water. Does place-based education actually change their environmental behavior?"

The answer to this question is still forming. When you ask this question of academics, researchers, and program developers, the generic response is, "Well, anecdotally we've got lots of studies that suggest significant change, but there are really not a lot of hard numbers." The recently formed Place-Based Education Collaborative (PEEC) is conducting research to generate these hard numbers. This collaboration between a number of northern New England place-based education programs and the Upper Valley Community Foundation is interested in documenting changes in environmental attitudes and behaviors, but it will be a few years before definitive results are available.

Nonetheless, let me share with you just a few of the existing research studies that take a stab at quantifying the relationship

between place-based education and changes in environmental attitudes and behavior. In a study entitled *Schoolyard Learning: The Impact of Schoolgrounds*, researchers at the Education Development Center in Newton, Massachusetts, pulled together the

As the diversity of the natural landscape on schoolyards increases, there's an increase in children's appreciation of experiences in the natural world. These changes in environmental attitudes prove the affective basis for stewardship behavior—for acting in ways that improve the quality of the environment.

available studies that look at how schoolyards shape environmental attitudes (Education Development Center, 2000). This study was commissioned by the Boston Schoolyards Initiative because their funders want to know if pulling up all that asphalt and creating naturalized playgrounds throughout the city really makes any difference. There's some evidence to support revving up the jackhammers. These results are relevant not only for the Boston Schoolyards Initiative, but also for place-based educators because many school improvement projects including transforming the schoolyard into a more suitable learning environment for teachers and students.

In 1989, Margarete Harvey studied 850 elementary students from 21 schools in the south of England. The schools she chose represented a range of types of schoolyards—from undifferentiated pavement to completely naturalized yards with ponds, trees, hideouts, and gardens. As you would expect, the children from naturalized schoolyards had more botanical knowledge. And there was a direct correlation between the scope of the children's knowledge and the amount of vegetation and complexity of landscape features. But there's more: "When compared to their peers from schools with undeveloped school grounds, students who had been exposed to more vegetation and landscape features showed higher scores for pastoralism (the enjoyment of the natural environment in an intellectual fashion) and lower scores for human dominance (the belief in humans' rights to use technology to adapt to and dominate nature)" (Education Development Center, 2000). What Harvey is saying is that as the diversity of the natural landscape on schoolyards increases, there's an increase in children's appreciation of experiences in the natural world. These changes in environmental attitudes prove the

affective basis for stewardship behavior—for acting in ways that improve the quality of the environment.

A study in Texas entitled *The Effect of an Interdisciplinary Garden Program on the Environmental Attitudes of Elementary School Students* supports Harvey's findings (Education Development Center, 2000). Using the same pastoralism and human dominance instruments, they found that children who participated in a school gardening program showed more positive environmental attitudes than peers who did not participate.

Then what about behavior? Lynnette Zelezny combed the research journals and found all the studies from 1974 to 1999 that examined the effects of different kinds of environmental education programs on the changes in environmental behavior (Zelezny, 1999). The programs studied ranged from nature camps and residential environmental programs to short- and long-term school-based programs. Thus one of her topics of interest was the effectiveness of nature programs at environmental centers versus school-based programs that involved nature studies in the local landscape and community. The following summarizes her main findings.

- a. **“Educational interventions that actively involved participants were more effective in improving environmental behavior than those that did not.”** This is kind of a no-brainer, but it's nice to see it confirmed by research. It echoes the Texas study of third graders showing that when the same content was presented to two groups, students who actually engaged in investigation developed sturdier skills.
- b. **“Intervention effectiveness was greater among participants who were 18 years old or younger.”** Another no-brainer supporting the get-them-while-they're-young attitude. Forget about those college students if you want real change.
- c. **“Classroom interventions improved environmental behavior more effectively than interventions in non-traditional settings.”** Though the first two points are kind of obvious, this last one is significant. In other words,

in-depth school-based programs are more likely to change behavior than programs at the environment camp that are not integrated into the curriculum. For instance, this suggests that an on-going study of the vernal pool adjacent to the schoolyard is going to have more of an effect on students' environmental behaviors than a week-long stay at a nature camp. For funders trying to figure out how to get the most bang for their buck, this is a significant finding. And it provides some solid footing for those educators trying to weave environmental education into the fabric of public schools. If we can believe this study, then school-based programs do have the potential for creating persistent environmental stewardship behavior.

Let me end with a recent study that suggests a whole other domain we should be considering. In Denmark and Sweden in recent years there's a new kind of preschool program roughly translated as Outdoors in all Weather (Grahn et al., 1997). The core idea is to spend the majority of time, say 60 to 80 percent of the school day, in the out-of-doors. Doesn't matter whether it's sunny and beautiful or foggy and dreary or windy and snowy, put on those willies and out we go. There are programs in rural villages as well as in Copenhagen and Stockholm. So four-year-olds may be gardening and fishing, or they may be exploring alleyways and feeding pigeons.

What's the result? Students in the Outdoors in all Weather programs are suffering from 80 percent fewer infectious diseases (colds, ear infections, sore throats, whooping cough) than children in conventional indoor programs. That's huge! Can you think of a better reason for doing place-based education than to keep your children healthier? It makes sense, of course, since putting children in close proximity to each other in containers of poorly circulated air guarantees more effective transmission of viruses and bacteria. And it does, perhaps, correlate with the SEER findings of lower absenteeism in EIC programs. So here's another charge for you place-based educators: Start collecting data on nurse and doctor visits for children in your programs compared to children who aren't getting out as much. This kind of data *will* have an impact on parents!

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