



Environment-Based Education: Improving Attitudes and Academics for Adolescents

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I have a learning disorder and I can't read well. Now our classes are like living books and I can learn so much better without feeling bad about myself. Teachers are actually listening to my opinions and we respect each other.
—seventh-grade female student

One may imagine . . .

- middle school students engaged in real-world, community-based, standards-aligned environmental investigative and service-learning projects that improve their school attendance, behavior, social skills, and—ultimately—their grades;
- teachers of all disciplines working alongside parents; representatives from local businesses and universities; and federal, state, county, and nonprofit environmental groups to help students connect mathematics, science, social studies, and language arts—as well as learning in general—to their own lives and identities;
- a process under way to build sufficient community and school support to sustain a promising education reform initiative within and around each school community and to develop effective leaders and organizations that design, implement, and link environmental education across the state to promote long-term sustainability for that effort; and,
- environmental education (EE) gaining renewed respect and value in the public school system.

Imagine no longer!

Using the Environment as an Integrating Context™ (EIC) for student learning, the South Carolina EIC School Network is changing the way that teachers teach and students learn at ten pilot middle schools in the state. Data collected in forty-eight schools across the nation since 1996 indicate that the EIC Model™ program has significant positive effects on academic achievement, classroom behavior, and instructional practices.

What is EIC?

The EIC Model™ employs natural and social systems as the context for learning while taking into account the best practices of effective educators. Each school designs an EIC Model™ program unique to its own needs and objectives, but successful EIC Model™ programs share the following fundamental strategies:

- integrated, interdisciplinary instruction;
- collaborative teaching methods;
- community-based investigations;
- learner-centered, constructivist approaches (students asking, teachers guiding);
- cooperative and individual learning; and
- use of local community and natural settings as the context for learning and instruction.

The EIC Model™ is based on national research conducted by the State Education and Environment Roundtable (SEER), a cooperative effort among sixteen state agencies that seek to improve students' academic achievement in *all* core disciplines using the EIC Model™. This model has shown success in every state in which it has been implemented. You may visit the SEER Web site at <http://www.seer.org> for more information. You can also access the executive summary of the report *Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning*, by Gerald A. Lieberman and Linda L. Hoody (San Diego, CA: SEER, 2000) at this URL.

The South Carolina EIC Model™ School Network is a joint endeavor of the South Carolina Department of Education and SEER.

Isn't this environmental education?

We cover more subjects in class, and we don't just have tests and worksheets this year. We work on projects, demonstrations, and reports that make it more interesting.

—sixth-grade female student

The EIC Model™ is not traditional EE. The differences are subtle but significant. The EIC Model™ focuses on educational results: using the environment—integrating it throughout the disciplines—to engage students in the process of their education and enrich their learning experience through real-world, hands-on, community-based projects and activities, with the ultimate goal of helping these students not only to understand and appreciate the environment but also to achieve higher levels of overall academic success.

Students examine in depth the relationships and interactions both within and among their local natural and social systems. Community partners assist teachers and parents in the effort to guide and encourage student learning. Students work together and individually and are allowed input into their own course of study. They see teachers truly teaming and thus are led to realize that all subjects are not only interconnected but have value in themselves. State curriculum standards serve as the foundation.

“Systems thinkers” look at

- the big picture,
- the long term,
- causes and effects (inputs and outputs both individually and collectively),
- multiple points of view that may lead to paradigm shifts,
- patience and collaboration as a means of accomplishing resolution, and
- the many parts and their interrelationships and interactions that comprise natural and social systems.

What Students and Teachers Do in South Carolina

Students and teachers explore social systems such as housing developments, commercial districts, and public utilities, and natural systems such as wetlands, large rivers, maritime forests, town creeks, tidal marshes, and old rice fields. They investigate the impact of school traffic on air quality, the condition of their school’s water system, the effect of erosion and poor drainage on the quality of life, and the effects of human culture on the environment. For their community and school they build trails, water-habitat gardens, and outdoor classrooms; pick up and recycle roadside litter; give presentations to school boards, PTOs, and town councils; write letters to key community officials; and develop plans for continuing their efforts in the years ahead. For middle school students of all ethnic backgrounds, academic levels, and state regions, these endeavors become a major part of their standards-based instruction and curriculum as guided by their teachers during the school year.

The Players for South Carolina

Middle schools. Ten middle schools (and school districts) in the state have made a big decision to train staff and devote time to develop, implement, and evaluate the EIC Model™ initiative:

Colleton (Colleton School District)
Conway (Horry School District)
Forest Circle (Colleton School District)
Gilbert (Lexington School District One)
Kelly Mill (Richland School District Two)

Long (Chesterfield School District)
Palmetto (Anderson School District One)
Pickens (Pickens School District)
Rawlinson Road (York School District Three)
Waccamaw (Georgetown School District)

These ten pilot schools are a diverse group with regard to ratings on the state’s school report cards, enrollment size, student ethnicity, family income levels, and geographic region. Currently, over 1,450 of South Carolina’s middle school students—supported by over 85 teachers, administrators, and community partners—are involved in the EIC Model™ initiative.

Community partners. The following agencies, governments, foundations, and organizations now share the vision by providing EIC Model™ school support with grants, student and teacher mentors, materials, and in-kind contributions:

Beaufort Soil and Water Conservation District	Society of American Foresters (SAS)
Birchwood Center for Arts and Folklife	South Carolina Coastal Conservation League (SCCCL)
Captain Planet Foundation	South Carolina Department of Health and Environmental Control (DHEC)
Cheraw Fish Hatchery	South Carolina Department of Natural Resources
Clemson University	South Carolina Department of Parks, Recreation, and Tourism
College of Charleston, Project Oceanica and COASTeam Program	South Carolina Forestry Commission
Colleton Museum	South Carolina Wildlife Federation (SCWF)
Environmental Education Association of South Carolina (EEASC)	SouthEast Center for Ocean Sciences Education (COSEE)
Gaylord and Dorothy Donnelley Foundation	United States Fish and Wildlife Service
Gilbert Town Council	United States Department of Agriculture Forest Service
Kalmia Gardens at Coker College	V. Kann Rasmussen Foundation
Lake Carolina Development, Inc.	Wal-Mart Stores
Lexington Soil and Water Conservation District	York County Culture and Heritage Commission
Master Gardeners of South Carolina	
National Fish and Wildlife Foundation	
Native Plant Society of South Carolina	
PalmettoPride	
Richland Soil and Water Conservation District	

The list continues to grow as more local businesses, agencies, and interested citizens offer their time, money, and expertise to the EIC Model™ effort. Core team mentors have personally totaled almost 1,500 hours assisting their schools. At the volunteer rate of \$17 per hour, the figure comes close to \$25,000.

Why middle school students?

My child hardly ever talked about school, but now she can't stop chatting about her EIC classes. She is now interested in school, and her grades are really improved. You don't know what a difference this has made with my daughter.
—parent of a seventh-grade student

Middle schools were chosen because of the low academic performance exhibited historically by students in this age group. South Carolina's ninth-grade dropout rates and high school graduation rates, as well as end-of-course and tenth-grade exit examination failures, are among the highest in the nation. According to research by Lieberman and Hoody, authors of *Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning*, a successful academic program for K–12 students emphasizes personal attention, sustains an environment that promotes the sense of “belonging,” and actively engages them both in learning and in participating in school activities.

The quality of the middle school experience is the turning point for many adolescents. The South Carolina EIC Model™ team believes that middle school students can and will respond to instructional strategies and classroom management practices that encourage student and teacher teaming, accountability, respect, and service learning within the local community.

Students can rise no higher than the level of expectation that teachers and the other adults in their lives have for them.

The Plan

I was not a good student last year. My behavior was bad and so were my grades. I am on the honor roll now, and I don't want to get into trouble. The teachers are cool and trying real hard. I don't want them to be disappointed in me. I am proud to be on the EIC team.

—seventh-grade male student

The EIC Model™ team's intent is to create a strong base of EIC Model™ support—within individual schools, throughout communities, and across the state—by leveraging available resources and decreasing the fragmentation of effort and program duplication. The team believes this initiative will lead to improvements not only in student behavior, academic performance, and participation in school activities but also in teacher confidence, skills, and practices.

Our goals:

- To strengthen teacher practices, confidence, and skills
- To improve student attitude, behavior, attendance, and involvement in school and community life
- To strengthen students' understanding of the interactions within and among natural and social systems
- To improve student achievement in all core disciplines
- To build local, regional, and statewide capacity to sustain the EIC Model™ initiative

Is there proof in the pudding or just fluff?

This year all my subjects are fun. But Mr. Falco, don't tell anyone we are having fun, because they will think we are not learning anything and will take EIC away from us. I am learning. Really, my grades and my behavior are so much better, and I won some awards that I never thought I could.

—sixth-grade male student

I want to attend classes this year because all my teachers are so much more fun this year and seem to care about my opinion. We are doing cool things. They have taught me respect for lots of things. Learning can be fun, especially being outdoors and helping our community. Even my teachers seem to have fun this year.

—seventh-grade male student

Quantitative and qualitative EIC Model™ data collected in South Carolina by an outside evaluator the first year of the program's operation in the state show improvements in student attendance, behavior, and attitudes—the first steps toward academic achievement. Teacher confidence and classroom management skills also improved as students responded.

South Carolina student survey results indicate that EIC Model™ students tend to have strong positive feelings about English language arts, teamwork, solving community problems, and their teachers' ability to encourage them. They like their core team teachers' different instructional strategies. They also express strong negative feelings about the disruptive behavior of others in their classes. In contrast, one of the negative findings of the survey is that the majority of these students still do not read books about nature.

Still, it is difficult to discount the many positive things that South Carolina's EIC Model™ students are saying, writing, and displaying. The descriptive writing below comes from a seventh-grade male student who has experienced very difficult times in school, both academically and socially. It was written within several minutes and is completely unedited. As his teacher said, "Something in the woods inspired him that day":

Sounds of crickets in the open woods. The river running through a jungle of wonders. Birds are chirping the great mother of nature. The squirrels running through the woods with lots of freedom. Yes, I do love nature. Take care of your surroundings [sic] and you will be paid great rewards. The dirt is like soft sheets of feathers and just another thing trying to beautify the world.

Perspectives like this can (and will) inspire others and influence the world!

Attendance and Behavior

Last year I had about 72 behavior referrals to the office because I just didn't like my classes or my teachers, and I was bored stupid. This year I had just one referral to the office, and it really wasn't my fault. I don't want to get into trouble now; EIC is a neat way to learn and lots of fun. We are helping our community. I don't want to let the teachers down. They are really neat. My grades are holding steady too, and for me, that is a good thing.

—seventh-grade female student

Getting students to attend school and to stay in school until they graduate are major education concerns in this state. According to South Carolina Kids Count's 2003 data trends (online at http://www.sckidscount.org/trends/sctr_drop.asp?COUNTYID=47), an average of 35 percent of the state's eighth graders were not enrolled in school four years later, when they would have been expected to graduate. Using the most recent U.S. census data, the *South Carolina Young Adults State Report* tabulates figures (online at http://www.scyoungadults.org/sc_educ.html) revealing that of all South Carolina citizens between the ages of eighteen and thirty-four, 21 percent have never earned a high school diploma. Indeed, South Carolina's high school attrition rates are among the worst in the nation. As the Education Commission of the States has reported (<http://www.ecs.org/clearinghouse/53/64/5364.htm>), almost 80 percent of the nation's high schools that produce the highest number of dropouts can be found in just fifteen states—and South Carolina is one of them.

Getting middle school students to attend school regularly is also a major concern. And once these students are at school, the key issue becomes that of keeping them from engaging in and being exposed to the kind of disruptive behavior that leads to suspensions and overall dissatisfaction with school and that prevent students from actively and positively participating in the experience of their own learning.

If students come to school, stay in class, allow themselves and their classmates to learn, see value in learning, and respect their teachers, then academic achievement is bound to occur at some level. Yet while this situation may seem easy enough to create, it is actually quite difficult to maintain. With adolescents, multi-instructional strategies are necessary, and the EIC Model™ provides such an approach. As a program of integrated, community-based education, the EIC Model™ may thus help to bring solutions to some of most crucial issues surrounding the schooling of adolescents.

Although EIC teacher teams are not stacked with master teachers, EIC Model™ core team teachers are given rigorous professional development, ample planning time, and additional resources to implement the EIC Model™. Selected teachers willingly serve as change agents, work in a true teaming and interdisciplinary environment with their colleagues, and modify their instructional strategies to include the student in his or her own real-world, community-based learning. The classroom management skills and teaching effectiveness of these teachers translate into stronger student-teacher relationships as well as more productive parent-teacher relationships.

This is the first year, after twenty-five years of teaching, that I received no negative or irate parent calls for the entire year. It was amazing at best. Conversations about their student's behavior and academics were civil and respectful, and the parents knew we were working together as a team and had their child's best interests in mind.
—teacher

In an examination of the state's EIC Model™ schools conducted by the South Carolina Department of Education in 2002–03, the program's first year, it was found that EIC Model™ and non-EIC students within the individual schools had the same cross-section of academic and demographic profiles—with the exception of school A (see below), in which the entire EIC Model™ roster were lower-achieving students. First-year behavioral data suggest that the EIC Model™ is helping overcome student disengagement and that it has real potential to enhance adolescents' education. Many EIC Model™ students are making an effort to attend class regularly and not to be disruptive—a fact that is particularly important because disruptive behavior was a key concern voiced by students on the survey. This change in student attitude translates into more effective classroom teaching and learning, improved civility among students and teachers, and an environment that is more conducive to the educational process overall. Reducing the number of behavioral referrals and the number of in-school and out-of-school suspensions even by *one or two* means that students are more able to benefit from classroom instruction than they would have been otherwise.

Factors such as midyear teacher and administrative transfers or turnovers, district- and school-level budget issues, committed resources, reduced planning times for teachers, core team dynamics, and degrees of professional development—all played key roles in the progress and success rate the first year.

The following are the first-year results for seven of South Carolina's EIC Model™ programs:

- At school A, EIC Model™ students decreased their absenteeism by 22 percent and their suspensions by 36 percent from the previous year. All these students were academically low performing, and many of them had serious past behavioral issues.
- At school B, EIC Model™ students had half the amount of discipline referrals that the non-EIC students had. Interviews showed that EIC students had an increased interest in learning and an increased respect for their teachers.
- At school C, the entire student population of one grade participated in EIC Model™. These students' records were compared with their records from the year prior to the implementation of the EIC Model™ program: their total number of behavior referrals had decreased by 56 percent, their total number of in- and out-of-school suspension hours had decreased 75 percent, and their absences had decreased by 16 percent.
- At school D, EIC Model™ students—who comprised 31 percent of the students in their grade—accounted for only 3 percent of all the behavioral referrals and only 22 percent of the absentees. Sixty-four percent of the EIC Model™ students received academic incentive cards (which require a 3.0 GPA), compared to 28 percent of these same students the previous year.
- At school E, EIC Model™ students—who comprised 35 percent of the students in their grade—accounted for 25 percent of the students disciplined, 18 percent of the in-school suspensions, and 14 percent of the out-of-school suspensions.
- At school F, EIC Model™ students—who comprised 37 percent of the students in their grade—had only 20 percent of the in-school grade-level suspensions and only 8 percent of out-of-school suspensions.
- At school G, EIC Model™ students—who comprised 19 percent of the students in their grade—had only 4 percent of the behavioral referrals, 4 percent of the in- and out-of-school suspensions, and 12 percent of the absences.

All ten schools that participated the first school year of EIC Model™'s implementation in South Carolina, showed some degree of improved attendance, behavior, and academic achievement. In 2003–04, the program's second year, one EIC Model™ school received the Carolina First Palmetto's Finest award, and the judges specifically mentioned the school's EIC Model™ involvement as being central to their decision. And the Lexington Soil and Water District formally recognized the principal and EIC Model™ core team teachers at another EIC Model™ school for their project's wetlands efforts.

Student Achievement

Teacher-developed tests of environmental knowledge were given to all EIC Model™ students before and after they completed their community projects. Students showed a gain of up to 15 points on the posttests. The results are encouraging, given the fact each school designed its own tests and that five months elapsed between students taking the pre- and posttests.

At the end of the year, EIC Model™ students were given a one-paragraph environmental health open-ended scenario and were asked to write a response to that scenario, applying their understanding of natural and social systems within their community. Unlike the students' scores on the environmental knowledge tests, however, their scores on these scenario responses varied widely across schools—a fact suggesting that students do need help in recognizing

environmental problems, identifying community resources, and understanding the impact that their environmental work can have on the community.

One school that offers academic incentive cards noted that 64 percent of its seventh-grade EIC Model™ students achieved the 3.0 GPA required to earn such a card. The previous year, only 28 percent of the same students as sixth graders—who were not EIC Model™ participants then—earned incentive cards. This year, the PACT scores and the individual report card grades of EIC Model™ students will be analyzed to see if there is upward annual movement.

Student and parent interviews confirm the improved academic and behavioral findings. Students talk about making the A/B honor roll for the first time ever and about having received academic awards they never thought they would. Many students improved in all subject areas. They speak candidly about their failing grades the previous year and say that they are making big gains now. Some students confess that last year they made themselves sick just to avoid classes but say they are not doing that kind of thing this year.

To the students, EIC Model™'s most appealing features are the challenging curriculum, the engaging classroom instruction, the caring teachers who work together, the hands-on activities, and the opportunity to be outside doing service-learning projects for their community and to have fun while they are learning.

And the teachers . . .

This is my tenth year as a middle school teacher, and quite frankly I was seriously thinking about quitting. But this year is the BEST year that I have ever had, and the kids are responding in ways I never thought possible.

—teacher

The EIC Model™'s first and foremost objective is to ensure sufficient and timely high-quality professional development for teachers. The teacher is the oil that lubricates and stimulates the student's mind. Lesson plans must be standards-aligned, with teachers using instructional strategies that strongly appeal to the middle school student by fully entering into that student's world. These two factors—highly qualified teachers and engaging standards-based instruction—will allow South Carolina's students ultimately to rise to their highest individual level of academic success.

In support of these key objectives, many agencies and organizations have provided South Carolina's EIC teachers with resources and training at no charge. The EIC Model™ partnership with Clemson University, for example, has afforded EIC teachers and their colleagues with materials and on-site graduate-credit instruction in the SC MAPS (South Carolina Maps and Aerial Photographic Systems) curriculum. In addition, some EIC Model™ science teachers have been given JASON Project training; they will be using the interdisciplinary curriculum to support their EIC projects as they focus on South Carolina wetlands. Project Learning Tree, DHEC, and Texas Instruments have also given training and materials to EIC Model™ teachers. And the Museum of York County has offered free admission to all EIC Model™ students so that they can participate in the curriculum-based Eye on the Environment tour and the Earth and Sky Connection planetarium program for in-depth study of the ways that humans interact with their environment.

Teacher interviews and surveys show that these educators have improved attitudes and more confidence in the classroom, a renewed enthusiasm for teaching, new skills that improve their

instructional strategies, and an appreciation not only of the chance to truly team with one another and to integrate curriculum but also of the freedom and ability to be creative with their students.

I am having so much fun as a math teacher integrating real-world lesson plans and working with the other three content teachers on my EIC team. The students are taking a more enthusiastic interest in math.

—teacher

Grants and Donations

Through private grants secured by the State Department of Education, EIC Model™ schools and teachers have received funds totaling some \$113,500. This funding has covered the costs of field-study transportation; intensive professional development and substitute-teacher pay for core team planning; and materials and equipment such as computer microscopes, water test kits, graphing calculators, and probes for computer-based labs. In addition, several EIC Model™ schools have been winners in the DHEC Champions of the Environment monthly grant program, which awards a sum of \$500 for use in an environmental project. Through their EIC Model™ involvement, other schools have received private donations, including fifteen computers, and several grants.

What's next?

Currently, the effort is under way to secure funding to sustain the EIC Model™ initiative for three years beyond May 2005. Early data show promise, but the South Carolina EIC Model™ School Network program does need more time. A professional outside evaluator has been hired to develop, implement, collect, and analyze second-year program data. A full evaluation conducted over a five-year period is needed to support internal EIC Model™ school growth, provide adequate professional development, and determine the model's effectiveness in South Carolina.

While the EIC Model™ is not a remedy for all the ills of our society or our educational process, it certainly shows promise. Time, effort, and support will help determine whether this instructional strategy becomes a key ingredient in middle school reform—and ultimately in South Carolina's effort to produce civil, healthy, informed, and educated future leaders. Teaching the state's middle school students about their interrelationship with the environment can be the starting place. As Baba Dioum, a noted African ecologist, has asserted, "In the end, we will conserve only what we love, we will love only what we understand, and we will understand only what we are taught."

If you would like to join our team, contact Edward H. Falco, environmental education consultant for the South Carolina Department of Education, at 801-D Rutledge Building, 1429 Senate Street, Columbia, SC 29201. You may e-mail him at efalco@sde.state.sc.us or contact him by phone at 803-734-8861. You may also fax him at 803-734-6142.