

Education for Sustainability

Findings from the Evaluation Study of The Edible Schoolyard



This report summarizes preliminary findings from a study commissioned by the Center for Ecoliteracy (CEL), on behalf of its board of directors. The focus of the study is The Edible Schoolyard at Martin Luther King Jr. Middle School (ESY), a key CEL grantee since 1995. The Edible Schoolyard was founded by Alice Waters, chef and proprietor of Chez Panisse Restaurant.

The study focused on the Center's holistic pattern of "education for sustainability" which includes: ecological knowledge, cooperative school culture, immersion in a hands on project, and a sense of place. In addition, the study looks at children's health, nutrition, and knowledge of sustainable agriculture.

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EXECUTIVE SUMMARY

Education for sustainability¹ lies at the heart of the Center for Ecoliteracy's vision for K-12 education. Adopting Wendell Berry's idea of "solving for pattern"² the Center's holistic model looks for a solution to the fragmentation and isolation that lead to many of the problems seen in schools today. The Center applies a systemic process of problem solving that focuses on the connections within a pattern or system, such as a school, school district, or ecosystem. As one of the core group of funders for The Edible Schoolyard (ESY), the Center has observed and contributed to ESY's development for nearly a decade. Since 1995, The Center has granted \$650,000 to ESY and more than \$1.2 million to the Berkeley Unified School District.

The approach supported by the Center for Ecoliteracy and embodied in The Edible Schoolyard calls for a shift in relationship between teacher and student, adult and child, human and land, and is firmly planted in the context of a nurturing environment. The Center recognizes in The Edible Schoolyard the leadership and vision to adopt an environmental project as an integrator of curriculum and culture of the school.

In describing The Edible Schoolyard program, chef and restaurateur Alice Waters says, "Our program places food at the center and has students helping to feed each other. These children learn mutual respect from sharing meals, they learn self-respect from learning how to prepare meals and they learn respect for the planet from learning how to grow food in an ecologically sound way."

The Edible Schoolyard, located on the campus of Martin Luther King Jr. Middle School in Berkeley, California, provides urban public school students with a one-acre organic garden and a kitchen classroom. Using food systems—from seed-to-table—as a unifying concept, students learn how to grow, harvest, and prepare nutritious seasonal produce. By focusing on the garden and its adjoining kitchen, ESY provides a context in which to educate the whole child and seeks solutions to improving student behavior and student learning in ways that are not typical in the isolation of traditional classroom work.

Through this program, these young adults learn about the connection between what they eat and where it comes from, with the goal of fostering ecological understanding and revolutionizing the school lunch program. Experiences in the kitchen and garden promote a better understanding of how the natural world sustains us and promote the environmental and social well-being of the school community.

¹ Sustainable communities are designed in such a way that their ways of life, businesses, economies, physical structures, and technologies do not interfere with nature's inherent ability to sustain life.

² For more information, see "Solving for Pattern," an essay by Wendell Berry from his book *The Gift of Good Land*. Farmer/poet/philosopher Wendell Berry coined "solving for pattern" to distinguish "solutions" that worsen the problems they are intended to solve from solutions that "cause a ramifying series of solutions."

This report presents a summary of the trends found in a two-year evaluation that focused on the experiences and learning patterns of students at Martin Luther King Jr. Middle School after each spent time learning in ESY's garden and kitchen classroom. These experiences are contrasted with those of students from another Berkeley middle school with no garden or kitchen classroom on its school grounds at the time of this research.

This initial study focused on the holistic pattern of education for sustainability, including: ecological knowledge and understanding³; environmental attitudes and behaviors; cooperative school culture (e.g. improvement in self-esteem, interpersonal relationships, and attitude toward school); and sense of place. In addition, the study included children's health by looking at their attitudes, beliefs, and knowledge regarding fruit and vegetables. Subsequent reports will document this assessment as it continues to unfold by further evaluating student learning outcomes at King Jr. Middle School.

BACKGROUND

Center for Ecoliteracy

Through its grant making program, the Center for Ecoliteracy empowers educators to help children learn the values, knowledge, and skills that are crucial to building and nurturing ecologically sustainable communities. The Center adopts a systems approach to education and recognizes food systems as essential contexts that foster ecological literacy. The Center works with whole schools—including Martin Luther King Jr. Middle School—on projects that integrate the classroom with the natural world.

The Center for Ecoliteracy was founded in 1995 by Zenobia Barlow, Peter Buckley, and Fritjof Capra. Its work with The Edible Schoolyard led in part to the creation of its Food Systems Project, which adopts a whole systems approach to learning and public policy—linking instructional gardens, curriculum, children's health, school meal programs, and family farms to education for sustainable patterns of living. Moreover, linking garden and cooking activities with classroom lessons, the Center recognizes that students will develop a deeper understanding and appreciation of how nature sustains life. Through these real-world experiences working together, students develop a sense of community and gain self-respect and a sense of pride.

From the inception of The Edible Schoolyard, the Center for Ecoliteracy has supported the project through grant making and played a collaborative role in its development. CEL has assisted in the articulation of a framework for the ESY program, linking core

³ Ecological knowledge is an essential element in education for sustainability. The Principles of Ecology are six core concepts articulated by Fritjof Capra, Ph.D., author, systems theorist and Co-Founder of the Center for Ecoliteracy. These core concepts are the patterns and processes by which nature sustains life: Networks, Cycles, Flows, Development, Nested Systems, and Dynamic Balance.

curriculum to the enriched learning environment of the garden and kitchen classroom. In doing so, CEL has applied a pattern of education for sustainability which includes:

- A knowledge component connecting ecological content and an understanding of the patterns and processes by which nature sustains life.
- A real world context with a hands on experiential project that provides for the application of ecological knowledge.
- A social dimension in which students, teachers, parents, and others are given meaningful opportunities to work together as a community.
- A sense of place connected to the land.

The Center for Ecoliteracy also serves a supporting role through publication and dissemination of ESY's work⁴ and connects ESY in networks of schools engaged in innovation, especially with projects that make the environment an integrator of curriculum and school culture.

The Edible Schoolyard

The cooking and gardening program of The Edible Schoolyard grew out of a conversation between chef and author Alice Waters, and former King Middle School Principal Neil Smith. Planning commenced in 1995 and two years later, more than an acre of asphalt parking lot had been cleared. A cover crop was planted to enrich the soil, and in 1997, the school's unused 1930s cafeteria kitchen was refurbished to house the kitchen classroom. Today, the garden is a thriving space filled with vegetables, herbs, ornamentals, and fruit.

The mission of The Edible Schoolyard is to create and sustain an organic garden and landscape that is wholly integrated into the school's curriculum and lunch program. It involves the students in all aspects of farming the garden—along with preparing, serving and eating the food—as a means of awakening their senses and encouraging awareness and appreciation of the transformative values of nourishment, community, and stewardship of the land.

Today, the program is integrated into the daily life of the middle school. Garden classes teach the origins of food, respect for all living systems, and principles of ecology. Students work together to shape and plant beds, amend soil, turn compost, and harvest flowers, fruits, and vegetables. In the kitchen classroom, students prepare and eat seasonal dishes from produce they have grown in the garden. Students and teachers gather at the table to share food and conversation during each class. The cycle of food production is completed in the kitchen, as students eat fruits, vegetables, and grains grown in soil rich with the compost of last season's produce.

⁴ The book *The Edible Schoolyard* was published in 1999 by CEL's publishing imprint, "Learning in the Real World." It guides the reader through the challenges of starting an innovative garden project within the structure and framework of a public school. For more information, visit www.ecoliteracy.org.

INITIAL ASSESSMENT

Why Evaluate the Edible Schoolyard?

Until recently, the success of projects supported with grants from the Center for Ecoliteracy was described through observations and anecdotes. Intuitively, the Center recognized that the projects worked. Then, after almost a decade of observing these projects, CEL was moved to quantify results motivated in part by the widespread interest in garden and food systems-related projects. Over the past five years, these projects have attracted a great deal of attention from policy makers, organizations, and individuals locally, nationally, and internationally.

Anecdotal evidence of the benefits of school-garden programs is plentiful. The role that garden programs can play in helping reverse the trend toward obesity and reconnecting children to the food system seems obvious. However, what the school-garden community points out as missing are studies that quantify the results of garden-based education.

Moreover, a discussion of middle school garden-based programs like The Edible Schoolyard was scarce. In fact, it was unusual to find school gardens in middle schools, in part due to their organization and structure. Yet, research shows that high-performing middle schools generally have a positive school culture based on the needs of their student population. Those needs include positive social interaction with adults and peers, physical activity, self-competence and achievement, and meaningful participation in school communities. Based on its work with The Edible Schoolyard, CEL believed that The Edible Schoolyard's garden and food systems-based program promoted the type of school culture that was found at high performing schools.

Data Sources

This report is based on preliminary data collected during the 2001-2002 school year. Information sources include both qualitative and quantitative data. Data were derived from surveys and interviews with students, school leaders, teachers, and parents. The research team consisted of several researchers who looked at school records to assess grades, test scores, and attendance.

The student assessments took place at both Martin Luther King Jr. Middle School and another middle school in the Berkeley Unified School District (BUSD). One hundred-fifth graders, half from the Martin Luther King Jr. Middle School and half from the control school, were surveyed for this study. Pre-and post-assessments took place at the beginning and end of the school year, respectively. Sixty-four teachers from the two schools filled out surveys about educational climate and twenty-six ESY teachers contributed information about the subjects and students they taught.

The assessment tools looked for students to: identify fruit, vegetables, and parts of plants; order eleven garden-cycle scenes; demonstrate their understanding of ecological concepts; reflect upon their sense of place by ascertaining if the students knew the name

of the closest bay as well as where the water for this bay originates; and probe each student's relationship to the environment.

Early Findings and Implications

At this early stage of the assessment, several trends reveal that CEL's pattern of education for sustainability is coming to life through The Edible Schoolyard project at Martin Luther King Jr. Middle School:

- ***Academic achievement increased, as ESY students showed significantly greater gains in overall GPA and in two of four school subjects (math and science).*** Not only did the students at King see an overall increase in grade-point average, but their grades went up in the subjects of science and math.
- ***ESY students made greater gains in understanding garden cycles than did control students.*** As expected, students who participated in the garden-based learning program at King Jr. Middle School showed significantly greater gains on this part of the ecoliteracy assessment. Student gains in overall ecological literacy (total score for all parts of the assessment) also increased for ESY students.
- ***Psychosocial adjustment improved significantly on a standardized student report questionnaire for ESY students than for students at the control school.*** Not only did these ratings confirm anecdotal reports by many teachers and administrators over the years, but the individual student ratings of improved functioning were also correlated with teachers' independent ratings of the same students.
- ***ESY teachers ranked teaching academics, cooperation, and compassion for living things as their three highest priorities on a second survey.*** It is interesting to note that these rankings roughly correspond to the study's three most significant findings in the areas of grades, psychosocial adjustment, and garden life cycles.
- ***Teachers from ESY rated their school as more conducive to learning than did control school teachers.*** On a standardized questionnaire, teachers at Martin Luther King Jr. Middle School gave a significantly higher rating to the learning environment in their school than teachers in the control middle school.
- ***Student's sense of place and understanding of sustainable agriculture improved.*** Using a more traditional method of giving short answers to open ended questions, one of the most exciting findings thus far was the knowledge of Edible Schoolyard students in the following areas: definition of ecosystems, sustainable agriculture, and sense of place.
- ***ESY students who made gains in their overall ecoliteracy scores showed a significant improvement in what they ate.*** Students who made the greatest gains in overall understanding of ecological principles made significantly greater gains

in the numbers of servings of fruits and vegetables they reported eating. As childhood obesity increasingly worries health experts, parents, and educators, they are interested in finding ways to get children to eat a more plant-based diet. The findings from this study suggest that teaching students about where food comes from and how it is prepared—along with changes in the food they are served and what they are taught about nutrition—may be an important contributor to overall diet change.

Future Implications

Organizing a school around a pattern of education for sustainability can lead to remarkable gains. Adding the enriched learning contexts of a garden and kitchen classroom, where social and emotional aspects of learning are enhanced, and where the connection of the parts of the school, the school culture, and the curriculum takes place through this focus significantly enhances the learning experience.

To improve student nutritional health, students require healthy food choices as well as nutrition education, and experiences in the growing, harvesting, and preparing of these foods. To make this possible, schools need full service (as opposed to only warming) cafeterias. With budget cuts, many schools have been left without cafeterias. Fast food outlets, vending machines, and microwaveable meals often are the source of school lunches.

If students are educated in a respectful environment where they feel safe, violent incidences are reduced. Violence in schools is an ongoing concern. Efforts to shift school culture and redesign schools to create more inviting and supportive environments are critical components in school reform efforts.

Using a “solving for pattern” framework for sustainable philanthropy offers opportunities for foundations with seemingly disparate missions to collaborate. As a grant-making organization, the Center for Ecoliteracy has found that food systems programs, by nature interdisciplinary, embrace needs related to environmental health, education, early childhood, place-based education, sustainable agriculture, and health care, to name just a few.

Conclusion

When middle school students at a large urban middle school—with all the attendant problems and challenges of fragmentation, isolation, and other distractions—are given an opportunity to learn ecological knowledge in a real world context that immerses them in living systems, they are more enthusiastic about attending school, make better grades, eat healthier food due to wiser food choices, and become more knowledgeable about natural processes.

The findings and implications documented here demonstrate the complexity and difficulty of the work of education for sustainable living. It necessitates a new vision for education—one that “solves for pattern.” By exploring the connections between

seemingly disparate parts of the problems they face, the K-12 community can help students develop the knowledge, lifestyles, values, and skills that will lead to sustainable patterns of living. The Edible Schoolyard, in conjunction with Martin Luther King Jr. Middle School, is providing an excellent example.