

Living Systems and Leadership: Cultivating Conditions for Institutional Change

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Since its founding, the Center for Ecoliteracy, where Zenobia Barlow is executive director and Michael Stone is senior editor, has supported and advanced education for sustainable living in K–12 schools. One of our particular concerns has been leadership and systemic institutional change. We have sought to understand both how schools can themselves change and how to facilitate societal change for the sake of creating more sustainable communities. We have worked with thousands of leaders from schools across the United States and on six continents. In 2009 we established a Schooling for Sustainability Leadership Academy.

Inspired by systems theorist and Center for Ecoliteracy cofounder Fritjof Capra, our work has been strongly influenced by systems theory, especially the Theory of Living Systems. This article will explore the implications of this theory for leadership and change. We will illustrate its applications with examples from food systems change, an increasingly important area in schooling for sustainability, concluding with a discussion of the Center's current work at multiple levels of scale in the Oakland Unified School District, a large urban district in California.

CHANGE IN LIVING SYSTEMS

Out of our work with educational leaders, the Center for Ecoliteracy has developed a framework for schooling for sustainability that we call “Smart by Nature,TM” described in a 2010 *Journal of Sustainability Education* article, “Smart by Nature: Schooling for Sustainability,” by Fritjof Capra and Michael Stone. The Smart by Nature framework is based on four guiding principles: nature is our teacher; sustainability is a community practice; the real world is the optimal learning environment; sustainable living is rooted in a deep knowledge of place.

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Systems thinking is a corollary of these principles. When nature is our teacher, we observe the patterns and processes that sustain ecosystems. We discover that the dynamics describing the behavior of natural systems apply as well to human social systems and can guide us in our efforts to promote change in those systems.

“Systems thinking” comes in many flavors. Business management and education writer Art Kleiner identifies a “viable continuum of systems thinking practices, all with different degrees of rigor, different approaches, and different views of the nature of a system.”¹ The work of the Center for Ecoliteracy being discussed here is most affected by Living Systems Theory, as it is described by thinkers including Fritjof Capra (*The Web of Life: A New Scientific Understanding of Living Systems* and *The Hidden Connections: A Science of Sustainable Living*), Humberto Maturana and Francisco Varela (*The Tree of Knowledge: The Biological Roots of Human Understanding*), Joanna Macy (*Coming Back to Life: Practices to Reconnect Ourselves, Our World*), and Margaret J. Wheatley (*Leadership and the New Science: Discovering Order in a Chaotic World* and *Finding Our Way: Leadership for an Uncertain Time*).²

According to Living Systems Theory, living systems (cells, plants, people, corporations, schools, watersheds, economies) demonstrate properties, patterns, and processes different from those of mechanical systems. These suggest a number of strategies important for leadership, decision-making, and changing social systems. Among those that we have found most useful:

Nurture community; cultivate networks. Many of the qualities of a living system, according to Fritjof Capra,

are different aspects of a single fundamental pattern of organization: nature sustains life by creating and nurturing communities.... Because members of an ecological community derive their essential properties, and in fact their very existence, from their relationships, sustainability is not an individual property, but the property of an entire network.³

In the memorable words of organizational change theorists Margaret Wheatley and Myron Kellner-Rogers, “To create better health in a living system, connect it to more of itself.”⁴ In a social system like a school community, this can be accomplished by bringing people addressing parts of the problem together in networks of support and conversation.

Doing that can require special attention to including people who are sometimes left out of these discussions, such as food service staff and custodians. Teachers at one school with whom the Center works discovered that a new recycling and composting system they hoped to initiate would need cooperation from the whole community, but realized that for some time they had routinely been scheduling staff meetings at times when only teachers were free to attend.

Work at multiple levels of scale. Throughout nature we find multileveled structures of systems nested within systems. Each of these has its own integrity, while at the same time being part of a larger whole. For example, cells in an animal are nested within organs,

which are nested within systems such as respiration or digestion within individual organisms, which in turn live in communities within ecosystems. In social systems such as schools, classes are nested within schools, which are parts of districts, which exist within local, state, and national political jurisdictions.

Systems are influenced by the larger systems in which they are embedded, and in turn influence those systems. Effective change usually requires acting simultaneously at several scales, as we will discuss below regarding the Center for Ecoliteracy's work in Oakland.

Recognize openings for the breakthrough of novelty. Natural and social systems generally remain in a stable state, says Capra, even while energy and matter, communications and ideas, flow through them. This tendency toward persistence is why systems last, and why they can be difficult to change.

Every now and then, however, a system will encounter a point of instability when new circumstances or information are introduced that the system cannot integrate without giving up some of its old structures, behaviors, or beliefs. This instability precipitates either a breakdown or—due to systems' capacity for self-organization—the emergence of new forms.

Former White House Chief of Staff Rahm Emanuel famously said, “You never want a serious crisis to go to waste, and what I mean by that is an opportunity to do things that you didn't think you could do before.” A good example in our work, as we shall see, is the epidemic of obesity and nutrition-related disease. It is certainly a serious crisis, a tragedy. At the same time, it has led school authorities, government, and the media to pay more serious attention to schools' impact on the health of children and communities, and has created opportunities to use a focus on food to introduce a variety of sustainability topics into the curriculum.

Cultivate systems' capacity for self-organization. Fritjof Capra has written, “Perhaps *the* central concept in the systems view of life” is that the pattern of life “is a network pattern capable of self-organization.”⁵ “Life constantly reaches out into novelty,” he says elsewhere, “and this property of all living systems is the origin of development, learning, and evolution.”⁶

“Living systems contain their own solutions,” says Wheatley. “Somewhere in the system are people already practicing a solution that others think is impossible. Or they possess information that could help many others. Or they defy stereotypes and have the very capabilities we need.”⁷

The Center has made use of this phenomenon by requiring attendees at many of our institutes and seminars to come as teams representing schools and districts. Groups of parents, teachers, administrators, and community volunteers—even people who had not previously worked together, and sometimes barely knew each other—have self-organized into effective ongoing working communities.

Facilitate, don't expect to direct, change in living systems. According to Living Systems Theory, change occurs spontaneously. The new forms that appear are not

designed or imposed by any individual, but emerge as a result of the organization's collective creativity. In the provocative maxim of Humberto Maturana and Francisco Varela, "You can never direct a living system. You can only disturb it."⁸

"We never succeed in directing or telling people how they must change," concludes Margaret Wheatley. "We don't succeed by handing them a plan, or pestering them with our interpretations, or relentlessly pressing forward with our agenda, believing that volume and intensity will convince them to see it our way."⁹

Change can't be imposed, but the process can be facilitated. Facilitating the emergence of change calls for a different kind of leadership that supports a system's capacity for generating creative solutions by nurturing its networks of connection and communication, by creating climates of trust and mutual support, and by encouraging questioning and rewarding innovation. Leaders need to be able to recognize the emergent novelty, articulate it, and incorporate it into the organization's or system's design. To accomplish this sometimes requires that they *loosen* their control and take the risk of dispersing authority and responsibility more widely.¹⁰

Plan on change taking time. "Quick fixes are an oxymoron," says Wheatley. "If leaders would learn anything from the past many years, it's that there are no quick fixes. For most organizations, meaningful change is at least a three- to five-year process—though this seems impossibly long. Yet multiyear change efforts are the hard reality we must face."¹¹

For instance, although it can feel counter-intuitive to action-oriented school reformers, the fastest way to achieve truly lasting change may be to begin by spending considerable time cultivating relationships among stakeholders before ever addressing objectives or agendas for change.

Be prepared to be surprised. As living systems develop and evolve, they generate "emergent properties" that are not predictable from the properties of their individual parts, much as the wetness of water cannot be forecast by adding together the properties of hydrogen and oxygen, nor can the tensile strength of steel be calculated by combining the strengths of iron and nickel.¹²

According to Margaret Wheatley, this capacity helps explain how even modest local efforts can achieve global impact:

In nature, change never happens as a result of top-down strategic plans or from the mandates of any single individual or boss. Change begins as local actions spring up simultaneously around the system. If these changes remain disconnected, nothing happens beyond each locale. However, when they become connected, local actions can emerge as a powerful influence at a more global or comprehensive level.... Emergent phenomena always have these characteristics: They are much more powerful than the sum of their parts; they always possess capacities that are different from the local actions that engendered them; they always surprise us by their appearance.¹³

SCHOOL FOOD FROM A SYSTEMS PERSPECTIVE

These principles have informed and guided the work of the Center for Ecoliteracy, including its engagement with efforts to change school food.

The Center evolved from the Ecoliteracy Project of the Elmwood Institute, an international ecological think tank founded by Fritjof Capra to address problems in business and education from the perspective of systems thinking. In 1995 Capra, Elmwood Institute director Zenobia Barlow, and philanthropist and environmental activist Peter Buckley founded the Center for Ecoliteracy to apply systems approaches to K–12 education.

One of the Center’s early strategies consisted of identifying and supporting a network of exemplary schools with holistic curricula organized around place-based projects. These schools had discovered that cooperation and learning often increased, and grades and retention improved, when learning was integrated with hands-on natural-world projects such as watershed restoration and school gardens.

Gardens and watersheds proved to be particularly effective settings where children could experience living systems and basic concepts of ecological literacy firsthand—the flow of energy from the sun to plants and animals, planetary cycles of water and weather, the web of relations embodied in every bite. Gardens and habitat restorations allowed students to be more physically active, to use all their senses, and to engage themselves in projects that matter. Their sense of wonder awakened as they found life teeming in a handful of soil or nurtured a seed into a healthy plant. School gardens also created opportunities to expose children to fresh, nutritious food that they had never tried, but were willing to sample because they had grown it. The Center supported a number of school garden projects in its early years. It was, for instance, the first major underwriter of the famous Edible Schoolyard, founded in 1995 by Alice Waters at Martin Luther King Middle School in Berkeley.

As important as school gardens were (and continue to be), we discovered that lessons about healthy eating were often being undermined by the realities students encountered when they entered the lunchroom—meals high in fat, calories, and sodium; heavily processed “foodlike” entrees that had been shipped over thousands of miles; unappetizing offerings that frequently went straight from the tray into the trash; insufficient time to eat; noisy, unpleasant surroundings; soft drink machines in the hallways and “a la carte” junk food sold in competition with the school meal program; the stigma of being identified as poor, which led some children to skip meals rather than participate in government-subsidized meal programs.

None of these problems is new. For a long time they have been accepted as simply the way things are—an instance of “hidden curriculum,” lessons (often unintentional) that schools teach through their actions, assumptions, and structures. In recent years, however, a new movement has begun to emerge and gain momentum. Its genesis and many of its successes reflect the living systems principle that novelty arises and previously unyielding systems become susceptible to change in the face of information and circumstances that their old forms cannot accommodate—in this case growing awareness

of an epidemic of childhood obesity, diabetes, and other nutrition-related illnesses. In our book *Ecological Literacy*, Ann M. Evans, a former official in the California Department of Education, mayor of Davis, and long-time food activist, describes the shift:

One of the problems confronting food reformers has been the “snicker factor,” the “you can’t be serious” reaction to efforts to make school food a priority for educators faced with high dropout rates, low academic achievement, violence on campus, and other pressing issues.

By fortuitous timing, public attention is sometimes grabbed by the symptoms of the systems issues we are trying to address. When that happens, we need to be ready to take advantage before that attention shifts, as it always will. We’ve recently seen widespread attention directed at obesity and other nutrition-related health issues, and a change in public perception about what kinds of products are appropriate for schools and student stores to sell on campus. Such concerns, which the public and elected officials share, can be an entrée for demonstrating how seemingly separate problems are connected and how food, nutrition, and health affect students’ ability to pay attention, learn, and succeed in school.¹⁴

From the beginning of its involvement with school food reform, the Center has employed a network strategy. We convened seventeen community-based organizations in Berkeley for a proposal to the U.S. Department of Agriculture for a Food Systems Project (1999-2002) to introduce food policies at school and city levels, establish salad bars and gardens at each Berkeley elementary school, and bring fresh, organic produce to the lunchroom. One result was adoption of a Berkeley Unified School District food policy—the first district food policy in the nation—that helped to inspire a federal mandate that every U.S. school district implement a wellness policy by 2006.

The Center later funded a Fertile Crescent Network of schools, replicating the Food Systems Project in five contiguous Bay Area counties, bringing together educators, farmers, nutritionists, food service directors, and sustainable agriculture activists, creating links between bioregional sustainable agriculture and food in schools. We convened a regional Food Service Directors Roundtable of food service innovators.

In the course of analyzing school food from a systems perspective, we were reminded that food systems are difficult to change because they are nested in larger educational, economic, and political systems that in turn reflect much bigger trends—among them centralization, industrialization, standardization, and globalization.

This understanding inspired recognition that food is an excellent focus for sustainability education. How we grow, process, transport, market, prepare, and dispose of food is at the center of a myriad of sustainability issues, including resource use, energy, pollution, water quality, and soil conservation. Food provides an entry for teaching about connections between such issues as hunger, trade policy, energy use, and climate change. Teachers are frequently concerned about sustainability becoming one more subject to be piled onto their heavy loads. The heightened attention to food issues that results from concern about obesity and nutrition-related illness, however, creates an opportunity and a

context for using food as a focus for introducing wider sustainability topics into the curriculum.

RETHINKING SCHOOL LUNCH

The Center incorporated lessons learned from the Food Systems Project, the Fertile Crescent Network, and the Food Service Directors Roundtable into a planning framework it calls “Rethinking School Lunch.” The framework is an embodiment of Fritjof Capra’s earlier observation that “we understand that solving problems in an enduring way requires bringing people addressing parts of the problem together in networks of support and conversation.”

This framework identifies ten different pathways or aspects of school operations that relate to food change: food and health, wellness policy, teaching and learning, the dining experience, procurement, facilities, finances, waste management, professional development, and marketing and communications (Figure One).

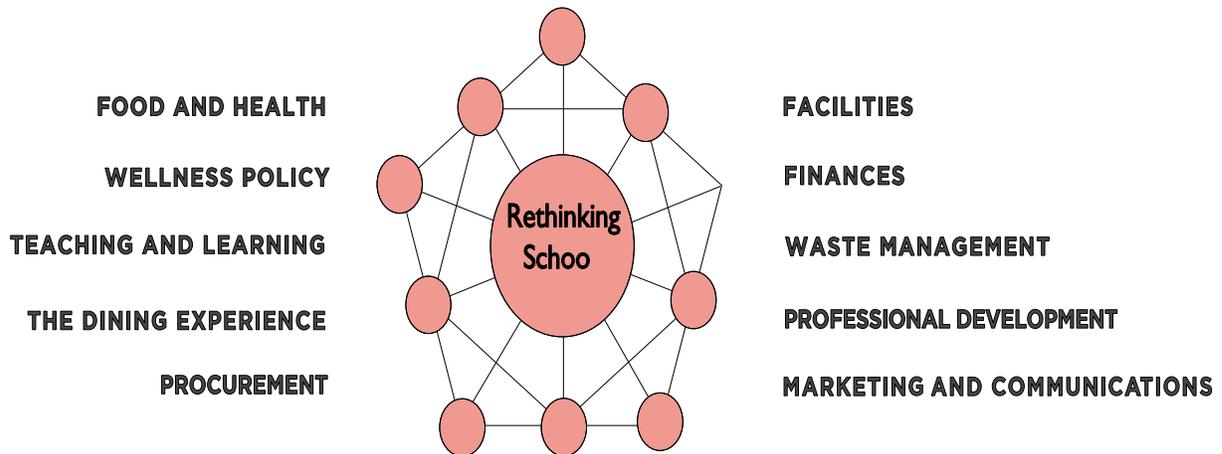


Figure One: Framework for aspects of school operations that relate to rethinking school lunch.

The web of connections formed within this framework is key. Change in one area simultaneously requires and leads to change in others. For instance, when he was nutrition services director in Santa Monica, California, Rodney Taylor (now at Riverside) wanted to address *food and health*. That led him to experiment with a new *dining experience*, a salad bar, which required changing the *procurement* process in order to purchase from farmers’ markets. Adding the new menu items depended on *professional development* to teach new food-handling procedures, as well as increasing staff. That required additional *financing*, which Taylor addressed by reaching out to PTAs and launching a *marketing and communications* campaign to attract more “customers” for school lunch.¹⁵

Attempting to alter everything at once can be daunting to newcomers to this movement, but those who wish to affect school food can begin at any point where they have resources, interests, and opportunities. The change process will eventually lead them to the other areas. Myron Kellner-Rogers describes this approach as “Start anywhere and follow it everywhere.”¹⁶ And just as a spider’s web becomes stronger when more of its strands connect, any group’s efforts will become stronger when connected to others’ work in the different areas.

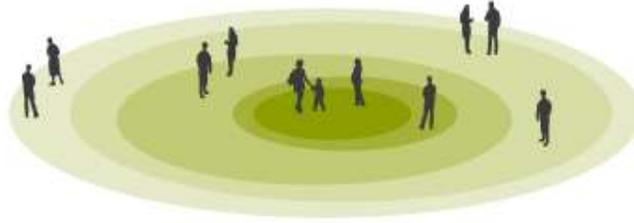
In 1994 the Center compiled an extensive online Rethinking School Lunch guide elaborating on these ten pathways. It thoroughly updated and revised the guide in 2010 (<http://www.ecoliteracy.org/downloads/rethinking-school-lunch-guide>). Over the past several years, the Center has presented this planning framework through a series of Rethinking School Lunch seminars, which have attracted change agents from across the United States, as well as from Brazil, Canada, India, Israel, Italy, Japan, Malawi, and the United Kingdom.

Beginning in 2004, the Center collaborated with the Berkeley Unified School District, the Chez Panisse Foundation, and Children’s Hospital Oakland Research Institute to create the Berkeley School Lunch Initiative. A UC Berkeley Center for Weight and Health study released in the fall of 2010 confirmed the effectiveness of this comprehensive multi-pronged approach combining gardening and cooking classes, increased attention to fresh, healthy school food, and classroom learning about food and health.¹⁷

SYSTEMS CHANGE AT MULTIPLE LEVELS OF SCALE: RETHINKING SCHOOL LUNCH IN OAKLAND

As noted earlier, both natural and social systems are characterized by a pattern of nested systems in which systems at one level are embedded in systems at other levels. The national school food system is a good example of a complex hierarchy, stretching from teachers at a single school to the U.S. Congress and the USDA. Different kinds of change are possible at different levels, and it is important for change leaders to understand where the decisions they care about are made and where authority lies.

Levels of Authority for School Food Systems



A PARTIAL LIST OF TYPICAL FOOD SYSTEM RESPONSIBILITIES.

Federal Government

- Sets reimbursements, income level requirements, and procedures for determining eligibility in national breakfast, lunch, and snack programs
- Determines minimal nutrition requirements for federally supported meals
- Creates policies for commodity foods offered to schools

State Government

- May supplement federal reimbursements
- Sets regulations for foods served in schools not participating in federal programs
- Administers food stamp nutrition education fund programs in schools
- Creates academic state-level standards and testing procedures

School Board

- Approves district operating budget
- Sets priorities for superintendent
- Approves federally mandated wellness policies for local districts
- Proposes tax measures for approval by voters

District Superintendent/Administration

- Establishes expectations and priorities for food service (break even, maintain a surplus, return a profit to the district, and so on), guided by federal requirements
- Recommends budget, may propose allocating additional funds to supplement food service income
- Determines where savings achieved by food service (such as reduced trash-hauling fees resulting from recycling programs) will be applied, guided by federal requirements.
- Oversees design, construction, and maintenance of kitchen facilities and resources
- Secures additional resources, such as funding to staff garden and kitchen classes

Nutrition Services Director

- Creates and manages nutrition services budget, determining how funds will be allocated among food purchases, personnel, equipment, etc.

- Sets menus and documents adherence to required nutritional standards
- Procures and oversees preparation of food; locates and negotiates with farmers, distributors, and vendors
- Determines food service staff roles, oversees staff training
- “Markets” food service to students and families

Principal

- Sets the tone, openness to change, and spirit of cooperation on campus
- Determines the level of support and encouragement for faculty and staff experimentation, collaboration, and innovation
- With teachers, creates class schedule (e.g., amount of time for lunch, the order of lunch and recess)

Teachers and Staff (sometimes constrained by union contracts)

- Choose whether and how to incorporate food and nutrition into classroom lessons
- Determine, within local and state requirements, how food may be used outside of meals (for instance for treats and celebrations, or as reward or punishment)
- Can model attitudes toward school food
- Usually maintain the most direct communication with parents

Adapted from Michael K Stone/Center for Ecoliteracy, *Smart by Nature: Schooling for Sustainability* (Healdsburg, California: Watershed Media, 2009). p. 29.

Effectively addressing most issues, including school food and food-focused education, usually requires efforts at multiple levels and from several directions: bottom up, top down, inside out, and outside in. The Center for Ecoliteracy is currently employing such a strategy in the Oakland, California, Unified School District (OUSD).

Although Oakland was California’s most improved large urban school district, as measured by test scores, over the last five years,¹⁸ it continues to face many challenges. Disparities along lines of race and family income are pronounced. By the time they reach 11th grade, only 14 percent of African-American students and 17 percent of Hispanic students are proficient in reading and writing, according to a *Bay Citizen* report. That stands in stark contrast to a 72-percent proficiency rate among white students.¹⁹

Significantly, Oakland superintendent Tony Smith, who assumed his position in 2009, believes that improving school food is one key to confronting these disparities: “School food reform is not separate from school reform; it’s part of the basic work we have to do in order to correct systemic injustice, pursue equity, and give our children the best future possible,” he says. “We are committed to building a school district that provides quality education and equitable outcomes for all children—and to make this goal a reality, we have to create conditions that allow children to grow and to learn at high levels. This starts with taking care of our students’ most basic needs, such as nutrition, so they can develop and reach their full potential.”²⁰

The Center for Ecoliteracy's systemic change strategy in OUSD entails working with a single pilot school (Cleveland Elementary School), a network of Oakland schools (the Oakland Food Web), and the school district's Nutrition Services Department, which serves 6 million meals a year.

Cleveland Elementary School: one teacher, one class at a time. "Why do you want to work here?" asked the principal at Cleveland Elementary School, who was interviewing Mary Schriener for a position as a special education teacher at the Oakland school. "Because your school looks like a prison yard, and I'd like to change that," said Schriener. Six years later, Cleveland sports six lovely gardens that serve as real-world classrooms, an ecoliteracy program in which all students participate, community support and recognition, and student research projects that are making tangible changes in the district's food program.

The school-wide change at Cleveland illustrates the creativity that emerges when connections are made within living systems. "This garden is not so much about plants, as it is about working on relationships," says Schriener. "It's about community in every way."²¹

The garden program at Cleveland developed organically, a reminder that systems can't be forced. Schriener began at Cleveland by "just sitting and observing the land, the dead zones on campus, children's faces, the way people moved across the grounds and interacted." She noted a neglected weed-ridden hillside and a class of special education students with a reputation for expressing misguided anger over not having a permanent teacher. "I felt a strong urge," she says, "to connect these two seemingly unpromising places and draw out the life I knew was hidden beneath the surface."

She asked the students a simple question, "What is a weed?" which prompted discussion connecting to their personal lives. "We decided that weeds were things you didn't invite in, that just appeared in your life and you didn't want them there. They take up space, get in the way, suck all your energy. So it's a good idea to remove them." The students thoroughly enjoyed using their energy to remove the weeds. Then they asked, "Now that the weeds are gone, can we plant something we like?" "That's a great idea," Schriener responded. "When you remove something negative in your life, you need to replace it with something positive. I have some perennials and fruit trees we could put here."

Meanwhile, the rest of the students were watching and asking, "What are they doing? Can we do it too?" Their perceptions of the special education class were changing, and they wanted to be part of their positive action and community. The special ed students' self-perceptions were also changing as they found themselves in a leadership role.

Garden by garden, the campus blossomed—an orchard garden, an edible vegetable garden, a flower garden, a redwood garden with native plants, a flower/herb garden, a wildlife habitat garden. One principle has guided the development from the beginning: not sectioning off different areas for different classes, but rather connecting the system to more of itself: "It's everybody's garden. It's a community. It's a nice reflection of biodiversity and cultural diversity. You think, 'I'm part of this community,' which helps you realize, 'I'm part of this natural world.'"

Schriner's devotion and persistence (and her willingness to give up preparation time and lunch times to work with students in the garden) kept the project going for a long time. She is well aware, however, of the importance—as we described above—of cultivating networks of relationship and communications. Parent Nathan Stephens has led most of the garden construction projects. Neighbor Michael Bowen joined the Cleveland Garden Committee two years before his child ever attended the school. “Family farmer” groups of volunteer parents have watered and tended the garden for the past five summers.

Sarah Stephens, a PTA leader and children's book author, volunteered. Her involvement deepened when she helped organize the PTA's response after the school learned that the district was planning a “modernization” that included floodlights, cyclone fencing around the campus, and construction that would have obliterated much of the garden work. “It identified something for parents to rally behind,” says Stephens. It's an example of an unplanned intrusion that creates instability in a system but leads to the emergence of creative new forms. “I was trying to help people realize that it was a community garden, and it was the moment that we saved it from the construction that it just became a community,” adds Schriner.

Meanwhile, Schriner garnered support from local businesses and organizations — vegetable starts from Kassenhoff Growers, soil from Hammond Construction, tools and advice from the Temescal Tool Lending Library, gardening lessons and assistance on intensive gardening and construction projects from UC Cooperative Extension.

Schriner envisioned an “ecoliteracy under our feet” project to allow students to experience ecological concepts while at play. Parent, artist, and garden volunteer Margaret Chavigny created paintings on the playground illustrating the water cycle, plant parts, and a “human sundial” laid out by volunteers, calibrated to the school's exact longitude and latitude.

Over time, a series of regular events emerged as part of Cleveland's annual calendar. On Vegetable Soup Day, kindergartners and first graders harvest and clean vegetables that parent volunteers make into vegetable soup. On Plant Parts Salad day, second and third graders harvest and prepare salad ingredients and make homemade dressing, along with rotating through stations where they learn to identify plant parts and their functions. On Pizza Day, nearby Arizmendi Bakery honors fourth and fifth graders by making pizza using vegetables harvested from the school garden.

Plant parts painting:



Water cycle painting:



The human sundial:



Harvesting salad makings:



Making Salad:



Over the years, Schriener persuaded other teachers, “one teacher, one class at a time,” to bring their classes into the garden. She circulated newsletters each season, reporting on developments in the garden and opportunities that teachers might want to take advantage of. Assisted by Sarah Stephens, she led classes when asked, helped teachers to get started, or taught alongside them.

In 2009, after attending a Center for Ecoliteracy seminar, Stephens and Schriener proposed formalizing a Cleveland Ecoliteracy Program, to bring every class to the garden for a session every other week with Stephens. They secured a grant to pay for a part-time stipend. With the support of the Cleveland principal, they presented their proposal to the Cleveland faculty, which supported it. The program, which covers 50 percent of students’ science instruction, uses the school gardens as “living libraries” for acquiring ecological literacy, “the ability to read the natural world and respond to our part in it.” Gardens become a context for understanding and recognizing ecological principles, processes and patterns; analyzing and evaluating human impacts in the web of life; and engaging in constructive ways to support sustainable living.

As with all systems change, the program has had unexpected results. Mary Schriener reports that, “Turning disappointments into opportunities has become my central spiritual practice as a school gardener.” Because Stephens does not have a teaching credential, teachers need to accompany their students when she works with them. “After first we thought, ‘That’s too bad,’” says Schriener. “Then we said, ‘This is a great opportunity.’ As teachers, we never get the chance to observe our students learning. We see them excel in different ways in this environment, and we get to model the experiential discovery learning process.”

The Cleveland Project, beginning with one teacher and then spreading through the campus, has also jumped levels of scale to impact the food service of the whole district. While studying the concept of food miles in 2009, Mary Loeser’s fifth-grade class calculated the distance that the various items on the menu had traveled, and sent their findings to Nutrition Services director Jennifer LeBarre. Learning that the asparagus had traveled about 17,000 miles—although asparagus is grown within 200 miles of Oakland—helped inspire LeBarre to contact the California Alliance for Family Farmers, establish a farm-to-school program, and increase efforts to introduce fresh, local produce into Oakland meals. In 2010, Cleveland fifth graders expanded their school food research to include agricultural practices, farm worker issues, packaging, and other ecological concerns.

“I’ve had many, many moments when I almost want to cry,” says Mary Schriener, “because I can feel the community happening, not because of me, but because of the natural world that we’re trying to create conditions for at the school. There’s been so much magic around the garden, that I just have a lot of gratitude.”

The Oakland Food Web: a self-organizing community of practice. The work at Cleveland Elementary School has been supported by and has inspired food systems work elsewhere in the district through the Oakland Food Web, a network of Oakland schools that is a thriving example of self-organization.

In 2008, the Center for Ecoliteracy and Teachers College Columbia University offered two professional development institutes, “Rethinking Food, Health, and Environment: Making Learning Connections.” The institutes were designed to help teams from schools and districts to increase their understanding of systemic thinking; make connections among food systems, health, and related ecological issues; and develop plans based on the Rethinking School Lunch planning framework.

The Center received funding to offer scholarships to participants from underserved Bay Area school districts, including Oakland. Thirteen participants from Oakland were recruited. Mary Schriener from Cleveland School was among them, along with parents and teachers from other schools and staff members from OUSD Nutrition Services and the Alameda County Department of Public Health Nutrition Services. Although most of the Oakland participants didn’t know each other, we structured the institute so that they would work as a team, in order to increase opportunities for cooperation. “They ended up bonding in an amazing way,” says Center education program director Carolie Sly. “The idea of becoming one group was theirs.” In other words, in the manner of living systems, they self-organized.

Calling themselves the Oakland Food Web, this network of parents and teachers from four Oakland schools and district and county nutrition services has continued since 2008 to meet every five weeks and in yearly retreats to exchange ideas, encourage each other, share resources, and communicate with the district.

Organizational theorist Etienne Wenger coined the term “communities of practice” to describe self-generating social networks characterized by mutual engagement, a joint enterprise, and a shared repertoire of routines, tacit rules of conduct, and knowledge.²² Margaret Wheatley says that communities of practice represent a step beyond networks. While people network for important personal and instrumental reasons, members of communities of practice “make a commitment to be available to each other, to offer support to share learning, to consciously develop new knowledge. They are there not only for their own needs, but for the needs of others.” The focus of a community of practice also extends beyond its membership, to advance its field and share discoveries with others engaged in the same work.²³

Wheatley names four essential activities for nurturing and supporting new leaders as they move to a new unit of scale, from leaders-as-individuals to leaders-in-community: *name, connect, nourish, illuminate*.²⁴ The Center for Ecoliteracy has assisted the Oakland Food Web in all these activities, while encouraging it to continue to self-organize.

Individuals symbolize the recognition that they have become a community when they give themselves a *name*: in this case, the Oakland Food Web. The Center for Ecoliteracy participated in the naming process, and assisted by designing an Oakland Food Web logo:



Once the community has been named, it is important to find the means to *connect* and to keep those connections strong and present. “What the Center really offers,” according to Carolie Sly, “is behind-the-scenes support to help the group function.” She helps craft meeting agendas and has facilitated the annual retreat, which the Center has hosted, providing food and help with logistics that members don’t have time for. It has also offered support to pay for substitutes so that teacher members can attend Food Web retreats.

Third, says Wheatley, communities need to be *nourished* with many different resources—sometimes money or equipment, but also methods, mentors, processes, and most of all knowledge about what techniques and processes work well. Food Web members provide some of this knowledge for each other. Sly provides some in consultations with school teams. Some comes from guest speakers invited to retreats. The Center offers scholarships so that Food Web members can attend Center seminars.

Finally, leaders-in-community need *illuminating*, help in getting public attention for their efforts. The Center is documenting Food Web work. OUSD Nutrition Services staff members attend every meeting, and director Jennifer LeBarre attends the annual retreat. The district garden coordinator holds district-wide open houses and teacher in-services at Food Web schools. And, in the same way that Wheatley notes that communities of practice characteristically reach out beyond themselves, the Oakland Food Web is in the process of expanding to include new members, especially from less-well-served parts of the district.

With assistance from the Center’s Carolie Sly, Food Web members are improving classroom instruction in health and nutrition, science, and other academic areas through standards-based education. Members have created instructional gardens on each site, and some schools have started weekly farm stands where families can buy fresh organic produce. The Food Web has also become a recognized leader in reducing the waste stream in schools. One member school produced a training video for cafeteria recycling and held a symposium to offer guidance to other schools and district administrators. Exchanging information and learning about each other’s projects have been important, says Sarah Stephens, in helping members identify people with expertise and locate resources. Just as important, though, is “being reminded that we’re not alone” in this

important and sometimes stressful work.

Oakland Unified School District Nutrition Services: a district-level systems approach. Beyond what individual schools or a network can do, some change depends on the centralized administration, economies of scale, and coordination with everyone from suppliers to state and federal government that are made possible by action at the district level.

The Oakland Unified School District faces major challenges. In the midst of California's fiscal crisis, the OUSD budget was cut by another \$122 million in 2010–2011, and a parcel tax on the November 2010 ballot fell just short of passage. Teachers are working without a contract. Newspapers reported in late 2010 that as many as 40 percent of the district's highest-achieving students leave after the fifth grade, in favor of private, suburban, or charter schools.²⁵

All of that makes all the more critical superintendent Tony Smith's campaign to create equitable conditions that allow children to grow and to learn at high levels, including attention to nutrition and the health of children and their families.

The bulk of Nutrition Services' income comes from federal and state allocations for the 68 percent of OUSD students who qualify for free or reduced-price meals. At best, these funds are minimally adequate, and they are not always reliable. In 2008–2009, California failed to allocate sufficient funding to cover meal reimbursement requests, and OUSD did not receive an expected \$200,000 in funding for May and June meals.

The district is committed to a substantial increase in meals prepared from scratch with fresh food sourced locally. However, only 25 of OUSD's 91 cafeterias have fully operating kitchens where fresh food can be prepared daily. Three central kitchens produce 73 percent of the meals for the meal program. One of these kitchens is slated to close in 2010–2011. One that was designed to prepare 9,000 meals a day is preparing 20,000. Many sites lack the facilities to provide a salad bar that complies with food safety regulations. Nutrition Services staff members' experience and expertise in cooking from fresh ingredients varies widely.

With support from two Bay Area foundations, the TomKat Charitable Trust and the S.D. Bechtel, Jr. Foundation, and the assistance of leading experts from throughout the state, the Center for Ecoliteracy is partnering with OUSD on a comprehensive feasibility study based on the ten dimensions of the Rethinking School Lunch model: food policy, facilities, food and health, finance, the dining experience, professional development, procurement, waste management, marketing and communications, and teaching and learning. The feasibility study is testing the hypothesis that the problems and opportunities of a large urban school district can best be addressed through a network strategy, bringing the people addressing all ten dimensions into conversation with each other.

Before undertaking such a major project, the Center needs to know that a district is in a position to take advantage of it. We believe that principles derived from the Theory of Living Systems provide guidelines for evaluating readiness.

For instance: *Is there leadership throughout the levels of the system? Are the parts of the system in communication with each other?*

The fact that the superintendent has made improving school meals part of his strategic plan elevates the effort among the many priorities competing for district time and attention. “It’s almost like having our own publicist,” says Jennifer LeBarre, “providing public relations for what we’re doing in the meal program. Just as he has conversations about academic achievement, he has conversations about school meals. It also helps me to have a more direct line to people in Facilities or Buildings and Grounds and others that are important for what we’re doing, as opposed to the situation in some other districts.”

Are the people who will be affected by changes involved in planning for them?

OUSD Nutrition Services has been working for more than a decade to improve the meal program. The district institutionalized reform in a wellness policy that was written in 2001 (five years before the USDA required policies of all districts) and has been amended periodically since then. From the beginning, the policy process has worked at many levels. Nutrition Services director Jennifer LeBarre describes it as a good example of a top-down, bottom-up strategy: “It was a top-down mandate, but it really came from parents and community members around the type of meal program they wanted to see for Oakland children.”²⁶

Wellness policies in many districts across the country were simply delegated to the food service director, rubber-stamped by the school board, and then placed on a shelf to gather dust. In contrast, Oakland’s policy process followed the strategy recognized by systems theorists as most likely to produce long-term success: maximizing the participation of the people most concerned with addressing the system’s problems.

Does the system show a capacity for self-organization?

The wellness policy process was coordinated not by food services, but by the district office responsible for student, family, and community relations. An outreach meeting attracted 100 to 150 parents and community members who formed the committees that would work on the policy. Lively debate and disagreements ensued, of course, while the policy was being formulated, but it eventually received buy-in from all levels and parts of the community.

The resulting policy²⁷ is also one of the most comprehensive we have seen, far exceeding federal requirements. Among the changes instituted over the past decade: elimination or reduction of unhealthy items such as soda, high-sodium items, 90 percent of white bread, and trans fats from meal program offerings. Milk is 2-percent fat content and chocolate milk is offered only once per week. Deep fryers were removed from all school kitchens. The availability of fresh fruit and vegetables has been increased through various strategies, including the implementation of salad bars at 52 schools. Fresh fruit is offered daily at breakfast, and fresh produce is offered daily at lunch in all schools.²⁸

The emergence and development of the Oakland Food Web demonstrates an ability for self-organization within the district. The district continues to collaborate with outside

community agencies such as the Alameda County Public Health Department and the Healthy Eating Active Communities project, and with parent-initiated projects such as the Oakland School Food Alliance.

Does the system have the capacity to accommodate emergent properties?

OUSD and Nutrition Services are committed to pursuing ambitious goals that bear directly on questions of sustainability. One is equity. In spite of the significant differences between income levels of families at the “hill schools” in the wealthier parts of the city and those at the “flatlands schools,” the district intends to serve meals of the same quality at every school. This will require program improvements across the board. It will also require changed perceptions and attitudes. Parents from flatlands schools will need to be convinced that the hill schools are not receiving better treatment. (In fact, Jennifer LeBarre believes that the food at the flatlands schools may be a bit more palatable, because those schools are located nearer to the central kitchens). Parents from hill schools will need to overcome their natural inclination to focus their efforts on improvements for their own children and to participate as energetically in district-wide efforts on behalf of a whole that is better than its current parts.

Is the system prepared for a long-term change process?

The feasibility study is intended to develop a 10-year master plan for facilities, meaning that it will be completed when many of the current participants are no longer part of the district. The district’s history suggests that it does have a capacity for sticking with extended processes. Community participation continues, nearly 10 years after passage of the original wellness policy, even though many of its aims (written in the form of “to the extent possible...”) are not yet realized. Implementation of the wellness policy is monitored by an active Wellness Advisory Council including teachers, parents, students, administrators, guidance counselors, and the school nurse. A parallel Nutrition Advisory Council meets four times a year, helping to determine priorities and focus for the food program.

We are encouraged by the enthusiasm and cooperation of the OUSD administration and Nutrition Services Department, as well as the support of dedicated community funders. The project will provide an important laboratory for testing the efficacy of systemic change in a large institutional setting, undertaking reform at multiple levels of scale, disturbing the system in disparate ways while cultivating networks of relationship, trust, and communication that allow for the emergence of new patterns of sustainable practice.

¹ Art Kleiner, “The Continuum of ‘Systems Thinking’” in Peter Senge, et al, *Schools That Learn: A Fifth Discipline Fieldbook for Educators, Parents, and Everyone Who Cares about Education* (New York: Doubleday/Currency, 2000), p. 79.

² Fritjof Capra, *The Web of Life: A New Scientific Understanding of Living Systems* (New York: Anchor Books, 1996) and *The Hidden Connections: A Science for Sustainable Living* (New York: Anchor Books, 2002); Joanna Macy, *Coming Back to Life: Practices*

to *Reconnect Ourselves, Our World* (Gabriola Island, BC: New Society Publishers, 1998); Humberto M. Maturana and Francisco J. Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding* (Boston: Shambhala, 1992); Margaret Wheatley, *Finding Our Way: Leadership for an Uncertain Time*. San Francisco: Barrett-Kohler Publishers, 2005, 2007) and *Leadership and the New Science: Discovering Order in a Chaotic World* (San Francisco: Berrett-Koehler Publishers, 2006).

³ Fritjof Capra, "Speaking Nature's Language: Principles of Sustainability." In Michael K. Stone and Zenobia Barlow, eds. *Ecological Literacy: Educating Our Children for a Sustainable World* (San Francisco: Sierra Club Book, 2005), p. 23.

⁴ Margaret J. Wheatley & Myron Kellner-Rogers, "Bringing Life to Organizational Change." *Journal for Strategic Performance Measurement*, April/May 1998. <http://www.margaretwheatley.com/articles/life.html> (accessed December 10, 2010).

⁵ Capra, *The Web of Life*, p. 83.

⁶ Capra, *The Hidden Connections*, p. 14.

⁷ Wheatley, *Finding Our Way*, p. 106

⁸ Maturana and Varela, p. 162.

⁹ Wheatley, *Finding Our Way*, p. 105.

¹⁰ Fritjof Capra. "Life and Leadership." <http://www.ecoliteracy.org/essays/life-and-leadership-0> (accessed December 13, 2010).

¹¹ Wheatley, *Finding Our Way*, p. 71.

¹² Macy p. 41.

¹³ Wheatley, *Finding Our Way*, p. 178.

¹⁴ Ann Evans, "Changing Schools: A Systems View," in Stone and Barlow, p. 253.

¹⁵ Michael K. Stone, "Santa Monica and Riverside Salad Bars." (<http://www.ecoliteracy.org/essays/santa-monica-and-riverside-salad-bars>). Accessed December 13, 2010.

¹⁶ Wheatley, *Finding Our Way*, p. 110.

¹⁷ Dr. Robert C. and Veronica Atkins Center for Weight and Health, University of California at Berkeley, "Changing Students' Knowledge, Attitudes, and Behavior in Relation to Food: An Evaluation of the School Lunch Initiative," September 2010. <http://www.ecoliteracy.org/downloads/school-lunch-initiative-evaluation> (accessed December 12, 2010).

¹⁸ Oakland Unified School District website. <http://publicportal.ousd.k12.ca.us/199410817122452877/site/default.asp> (accessed December 13, 2010).

¹⁹ Alex Gronke, "Oakland Schools Focus on Achievement Gap." *Bay Citizen*. August 19, 2010. <https://www.baycitizen.org/education/story/oakland-usds-big-challenge-closing-gap/> (accessed December 13, 2010).

²⁰ Lisa Bennett, "Oakland Takes on Inequality through School Food." <http://www.ecoliteracy.org/blog/oakland-takes-inequity-through-school-food> (accessed December 13, 2010).

²¹ Quotations from Mary Schriener and Sarah Stephens are from personal communications with Michael K. Stone.

²² Etienne Wenger, *Communities of Practice* (Cambridge: Cambridge University Press, 1998), pp. 72 ff.

²³ Wheatley, *Finding Our Way*, p. 177.

²⁴ Wheatley, *Finding Our Way*, p. 174.

²⁵ Jill Tucker, "Oakland's Exodus of Brightest Students." *San Francisco Chronicle*, December 12, 2010, p. 1.

²⁶ Quotations from Jennifer LeBarre are from personal communication with Michael K. Stone.

²⁷ Oakland Unified School District Wellness Policy.

<http://www.schoolnutritionandfitness.com/index.php?page=wellnesspolicy&sid=2704091318147431> (accessed December 14, 2010).

²⁸ For a detailed summary of more of the changes made within the food service since 2001, see

<http://publicportal.ousd.k12.ca.us/19941081118021697/blank/browse.asp?A=383&BMDRN=2000&BCOB=0&C=57043> (accessed December 14, 2010).