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Design for Learning: Values, Qualities and Processes of Enriching School Landscapes

by

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ABSTRACT

Significant national attention and funding are being directed towards k-12 education. Amidst this change, school landscapes need to be reconceived and designed as interactive places for learning. Learning is most meaningful when it engages our senses fully, when it is grounded in daily life, and when play is part of the process. The design of school landscapes holds boundless opportunities to foster these experiences, and simultaneously enhance landscapes' values for the ecology of natural and community systems.

This paper presents learning values of school landscapes, as well as design qualities and processes that may enrich these landscapes for children and community. Concepts and issues are introduced with literature references and examples. These concepts are used as a lens to view three Seattle case studies that illustrate varied contexts of school landscapes. Conclusions focus on conditions that are needed to make enriched school landscapes an integral part of children's learning and community life.

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1. OVERVIEW

"If you want to change attitudes you don't begin by telling people something. You begin by creating a strong experience of it." - Jon Charles Coe, FASLA

In Seattle, two schools stand side by side - one public and one private. The public school lies at the bottom of a slope, with its asphalt play area confined by a chain link fence. The private school, at the top of the slope, contains diverse plantings and an intimate courtyard with quiet seating areas. What messages do these environments offer to the children who use them each day? And what learning potentials are afforded in them? Susan Janko, a professor of Education at the University of Washington, had her students observe these environments. The messages they found were clear. One student noted: the outdoor area of the private school prepares its students for navigating an ivy-league campus, and the public school's outdoor area prepares its students for navigating a prison yard.

While these stark observations may not be prophetic, they dramatize how neglected and impoverished many school landscapes are, be they public or private (figure 1). Their impacts on children's lives are not trivial. The conditions of indoor and outdoor school environments affect learning and development with increasing importance. School environments occupy a significant, and in many cases, growing portion of a child's daily life. If the environment is sterile and isolated from its surroundings, there is little opportunity for children to sense their connection to their natural and social community, despite what they study in their classrooms. School landscapes hold tremendous potential to enrich childhood experiences, integrate curricula, and foster community interaction. With growing numbers of children entering schools, increasing school construction, and greater national attention to improving education, school sites need to be redefined as engaging environments for learning - places that celebrate nature and civic life.



figure 1

The outdoor play area of this school leaves little opportunity for learning, comfort, or connections with nature or community.

*photo by: University of Washington
Department of Landscape Architecture
teacher workshop images*

1.1 Scope of Publication

This paper addresses the design of school landscapes to foster greater learning opportunities for schoolchildren and community, beyond their recreational roles of sports fields and play structures. In the US and other countries, school landscapes are being transformed into wildlife habitats, gardens, orchards, and green infrastructure such as bio-filtration systems. Such efforts not only enrich once-sterile landscapes, but offer multiple, ongoing opportunities for student and community-based learning.

This paper draws from literature and examples to introduce:

- 1) definitions of learning and outdoor learning environments;
- 2) issues and values for ecologically and culturally revealing school landscapes;
- 3) supportive design qualities and approaches; and
- 4) participatory processes that afford individual and social learning as well as foster a sense of connection with and stewardship for a place.

These concepts are applied to three case studies, in light of their conditions, process, and design. A concluding section considers essential conditions to maximize potentials of school-based landscapes enriching the learning and lives of children and their community.

a note on references and resources:

Throughout the paper, literature references are cited as (author, date, page), or when the author is noted in the reference, as (date, page). Complete citations are located at the end of the paper, by section. Additionally, a selection of programs and organizations supporting the design of outdoor learning environments as well as curricula are listed in a Resources section.

1.2 Defining Learning and Outdoor Learning Environments

What is an outdoor learning environment? Many images may come to mind as places, facilities and/or objects that support learning - a bench, a garden, a climbing structure, a wooded ravine, a courtyard. Outdoor learning environments may be places for "nature study", science experiments, creating and displaying art, playing games, or performing music. For children, and hopefully adults, **any** environment holds potentials to be a learning environment - but it fosters learning better with qualities and elements one can discover, observe, interact with, and/or connect to other identities, relationships, and processes. Yet when we examine places designed and built specifically for learning - such as schools - their landscapes rarely offer opportunities for discovery and experimentation. This paper focuses on outdoor learning environments as school landscapes and nearby open space that may foster many forms of learning.

How we define the term "learning" affects what design qualities and learning experiences to consider. Webster's New World Dictionary of the American Language defines learning as "the acquiring of knowledge or skill." Researcher Anna Sfard characterizes this definition as the acquisition metaphor of learning, and contrasts it with a participation metaphor of learning which is defined by "a process of becoming a part of a greater whole" (1998, p. 6). Through these metaphors, she reveals alternative learning goals, roles for student and teacher, and processes. Drawing from the participation metaphor, a host of literature on development notes that play is learning and a very meaningful form, since through participation, it engages mind, senses, body, and heart in the process (Allen 1974, Moore 1986, Moore and Wong 1997). And learning, whether acquisition or participation, may be manifested through cognitive, social, emotional, and physical development. These varied forms of development, and metaphors of learning, inform the design of school landscapes as outdoor learning environments.

Who are the learners of a school's outdoor learning environment? While "the students" immediately comes to mind, other community members also need to be considered in design. As the learning environment for students may extend into the community, there are growing examples of members of the surrounding community coming into the school (see Section 2). Both of these trends hold valuable potentials for the design character and evolution of school sites and surroundings.

This paper focuses on landscape qualities and experiences that enhance learning for children as well as adults, recognizing that each school's primary age group sets an individual context. The term "children" is used interchangeably with "students" to address students throughout K-12. Childhood is generally conceived as having three phases, with adolescence as the final phase (Cobb 1977, Sobel 1996). Educator David Sobel has developed an approach that tailors environmental learning to each phase of childhood. This is discussed in Section 2 to note an emphasis of particular landscape qualities or experiences (figure 2).



figure 2

A young girl's view of an ideal school landscape for learning includes a garden, animals, sand play, and traditional play equipment.

drawing from University of Washington Department of Landscape Architecture studio programming workshop with Normandy Park Academy Montessori students

Through design and the design process, landscape architects can play a key role in creating school landscapes with many layers of meaning. These layers include learning through formal curriculum as well as informal discovery of and interactions with landscape. Meaning is constructed not only through the landscape's "finished" composition, but also through its development. Through an inclusive, participatory process, adults and children can become a community of learners as they take part in the landscape's design and transformation.

1.3 Supportive Literature and Organizations

Within landscape architecture, the evolving practice and literature on outdoor learning environments includes familiar leaders. Frederick Law Olmsted's work created opportunities for children and adults to better understand place and society. A particular example is in New York City's Central Park; Olmsted located the Dairy so that city children could know where milk comes from. With America's early 1900s reform efforts, school gardens became a national phenomenon, and involved landscape architects such as Jens Jensen (Trelstad 1997). Lady Allen of Hurtwood's writings illustrated the learning and developmental values of the post World War II European adventure playgrounds, among other play environments. And the creative research, practice, teaching, and writing of children's outdoor environments by Robin Moore spans more than thirty years.

The literature of other disciplines also contributes greatly to understanding the meaning, values, and attributes of outdoor learning environments. Noteworthy journals include Environment and Behavior (Sage Publications, Inc.) and Children's Environments (E.& F.N. Spon until 1995). Additionally, the world wide web offers a seemingly endless source for articles, examples, programs, organizations, and book listings.

Great Britain's Learning Through Landscapes (LTL) organization has undertaken the research and development of enriching school landscapes since 1990 (Lucas 1995). It grew out of a 1986 research project examining school ground use, design, management and development. As a result, the British Government changed its policy on school grounds and published The Outdoor Classroom as a guide for change. Additionally, LTL was established to transform the way school grounds are conceived, developed, and used. Subsequent LTL publications are available through LTL and through Green Brick Road, a Canadian non-profit organization that "specializes in resources and information for students and teachers of global and environmental education" (www.gbr.org).

In the United States, the Department of Education's Educational Resources Information Center (ERIC) includes the "Educational Facilities Clearinghouse" as a resource on news, events, publications, web sites including those on facilities design. The Clearinghouse web site's "Information Resources" includes "Hot Topics" on issues such as community involvement in planning, playground design, schools for the future, and safety and security. ERIC also includes a database on "Outdoor and Experiential Education."

Several other organizations provide information, programs, and grants for school ground improvements. Three examples (with others listed in the Resources section) are:

- **The Center for Environmental Education of the Antioch New England Institute** provides illustrative examples and literature related to environmental education.
- **The National Wildlife Federation (NWF)** offers an extensive Schoolyard Habitat program and co-sponsors International School Grounds Day, a celebration started by LTL in 1995. The NWF web site provides information on creating and funding schoolyard habitats, and offers an email listserv.
- **The Center for Ecoliteracy**, with a mission to foster ecological literacy, "nurture[s] sustainable learning communities using the natural world as our guide" (brochure).

What seems most apparent, particularly through the abundance of current web-based resources, is that interest in the creation of outdoor learning environments draws in multiple disciplinary perspectives. The integration of these perspectives can greatly enrich the quality and values of school landscapes, which is the focus of the next section.

2. CHANGING VALUES FOR SCHOOL AND COMMUNITY LANDSCAPES

The changing nature of childhood, approaches to curriculum and learning, and community use of schools raise multiple values in transforming school sites from simply parking and play fields into engaging landscapes. Given mounting concerns about children's reduced ability to experience nature and their community in their daily life, school environments hold great potentials to offer such experiences. As an extension of the classroom, the school site can be used in varied studies for applied, active learning. A recent national study indicates that learning through the local environment enhances student performance and attitudes. The environment serves as an integrating context for learning and engages multiple intelligences. Similarly, as both children and the community use schools more extensively for before- and after-school activities, enriched school landscapes can welcome community life as well as foster informal learning. This section discusses these issues, and offers examples of innovative policies, programs, and partnerships that are transforming school landscapes into learning environments.

2.1 Childhood's Lost Experiences and Their Meanings

The rapid urbanization of land, combined with technological and societal changes, have created tremendous shifts in children's everyday lives. Within our own lifetime, dramatic changes are apparent. Consider how beloved childhood places and times differ from children you know today. The back woods have been cleared for houses, corner stores are replaced by shopping malls, and the freedom of getting around on a bicycle is questionable on today's busy arterial roadways. Television and computers occupy free time previously spent exploring outdoors.

How do the experiences of today's children shape their development and their understandings of natural and cultural surroundings? Children's everyday places and activities affect not only their intellectual understandings, but also their development in other ways - physical, emotional, social, and spiritual. Kevin Lynch noted, "In childhood we form deep attachments to the location in which we grew up and carry the image of this place with us for the remainder of our lives" (1984, p. 825). Such formative, multi-dimensional experiences require open-ended time, easy access, and suitable places (figure 3).



figure 3

This courtyard, with its manipulable gravel surface, enables the creation of imaginary worlds as well as informal interactions with community members.

photo by: author

2.1.1 Diminishing time, access, and place for childhood

Educator David Orr applies the term "ecological literacy" to understanding relationships within the natural world and human actions in it (1992, pp. 85-87). To be literate in a language, one needs to use it, everyday, in a variety of contexts. The opportunities for today's children to develop literacy in their natural and cultural communities are impoverished in each respect. Reduced time to explore one's surroundings, reduced accessibility, and diminished quality of both civic and natural contexts create conditions where the meanings of community in an ecologic, or relational, sense seem hollow.

Children's lives are not immune to the fast pace of our urbanized society. Their time is increasingly consumed by predetermined and supervised activities. The New York Times (November 1998) published findings of a University of Michigan 1998 study of children 13 years old and younger that compared its results with a similar 1981 study:

"Increasingly rare are the days when children had the time and ability to organize their own games of marbles, stickball, or cops and robbers. In their place are more time doing homework, more time running around with parents doing errands and more time participating in organized sports like soccer." (S. Holmes, p. A18).

In schools across the United States, classwork or structured activities are replacing recess. In Atlanta, this approach resulted in the construction of a school without a playground (Johnson 1998). Child development experts decry these changes, and "insist that free time and unstructured play are vital for intellectual and emotional growth, as well as skills of negotiating and cooperating" (Johnson 1998, p. A1). The elimination of recess also runs counter to addressing physical development concerns of obesity and other disorders linked to restlessness.

Changes in how time is spent contribute to children's access to their community, yet other factors also are limiting their connections. Researcher Sanford Gaster states "That children and youths in cities around the world are increasingly cut off from safely using and enjoying their neighborhoods has been asserted and studied for at least 2 decades. Factors. . . include increasing street crime and automobile traffic, and through vandalism or municipal neglect or mismanagement, the deterioration or destruction of parks, playgrounds, and schoolyards" (1991, p. 70).

Current patterns and scales of urbanization also reduce children's access to nature. Educator Clare Cooper Marcus notes that many college students, when asked to describe a favorite childhood place, "recall a wild or leftover place, a place that was never specifically 'designed.'" (1986, p. 124). Through creative play and exploration, these places were experienced and given meaning through a narrative developed by the child. Yet, as David Orr notes, such self-informed narratives are increasingly rare:

"Ecological literacy is becoming more difficult, I believe, not because there are fewer books about nature, but because there is less opportunity for the direct experience of it. . . . A sense of place requires more direct contact with the natural aspects of a

place, with soils, landscape, and wildlife. This sense is lost as we move down the continuum toward the totalized urban environment where nature exists in tiny, isolated fragments by permission only" (1992, pp. 88-89).

Orr's concerns are echoed by Gary Paul Nabhan and Stephen Trimble in The Geography of Childhood: Why Children Need Wild Places (1994). Nabhan applies Robert Michael Pyle's term "extinction of experience" to describe the loss of knowledge about nature through direct experience and storytelling. Pyle used this term to illustrate children's loss of frequent contact with wildlife, which Nabhan found occurring even among rural children in the desert Southwest. In a 1992 study of 52 children, "the vast majority of children we interviewed were now gaining most of their knowledge about other organisms vicariously" (1994, p. 87). Nabhan related this with a national survey of fifth and sixth graders, "in which 53 percent of the children listed the media as their primary teacher about the environment; 31 percent reported that they learned more about the environment from school, and only 9 per cent claimed they obtained most of their environmental information at home and in the wild" (1994, p. 88).

2.1.2 Developing self: mind, body, and spirit

In addition to inspiring intellectual development, contact with nature also enriches the body and spirit. In the 19th century, Frederick Law Olmsted conceived of urban parks as oases from harsh urban conditions for physical and social recreation. Today, the extensive research of environmental psychologists Stephen and Rachel Kaplan shows that people prefer natural environments and that nature provides a myriad of personal benefits. The restorative qualities of natural environments are generating renewed attention in designing health care facilities with therapeutic landscapes. Registered nurse/landscape architect Nancy Gerlach-Spriggs writes: "We feel renewed when we spend any time in nature, and in that sense, any garden can revive or rehabilitate us" (1999, p. 134).

For children, time to be in nature offers unique benefits to their cognitive, physical, emotional, and social development. An extensive study by LTL of children's perceptions of their school grounds showed that children find symbolic values in natural elements, and these elements inspired creative play (Titman 1994). Another LTL study of 400 schools indicated numerous benefits of well-designed grounds, including "the development of physical skills, the building of confidence through exploration of the environment and the acquisition of social and behavioural skills through learning to participate and share with others" (Stoneham 1997, p. 24). Robin Moore and Herb Wong identify similar values (1998) in the transformation of a Berkeley school from asphalt to a diverse natural setting (see Section 3).

The growing limitations of our current society hold troubling future consequences, since how children develop personal attachments to their natural and cultural communities impacts their understandings and efforts to sustain these communities. Yet as central places in children's daily lives, school environments remain immediate, and largely

untapped, resources for self-directed experiences of nature and community. Additionally, school landscapes may serve as valuable tools in formal education.

2.2 Alternative Learning Approaches and the Role of Landscapes

Experience-based learning, relating to Sfard's participation metaphor of learning, is gaining renewed attention in education. The noted early twentieth century educator and philosopher John Dewey called for making curriculum meaningful through the child's environment and experiences. Current research supports Dewey's theories, in applying curricula to real world situations. This concept is rooted in many approaches, including "authentic," experiential, hands on, applied, and expeditionary learning. Each suggests a potentially powerful role for the outdoor environment. Approaches grounded in child-centered experience and exploration, such as those embodied in Montessori or Reggio Emilia schools, offer vibrant examples of children engaged in learning through their environments. Recent U.S. initiatives also confirm the values of experience-based learning.

2.2.1 Redefining intelligence, experiential learning approaches, and findings

The recognition that people learn in different ways is central to Harvard psychologist Howard Gardner's theory of multiple intelligences. He initially identified seven intelligences: linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial, interpersonal, and intrapersonal. His recent book, Intelligence Reframed: Multiple Intelligences for the 21st Century, adds an eighth, naturalist intelligence, which is explored in reference to his framing of intelligence as "a biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (1999, pp. 33-34).

Gardner believes we each possess a unique, and developing, set of intelligences. He presents a compelling argument for educational processes that introduce material and build understanding through multiple approaches, and describes such approaches to engage students in a particular topic. These approaches generally draw upon specific intelligences. Of particular relevance to the development of outdoor learning environments is his "hands on" approach. Gardner notes that children especially engage with a topic through activities "where they can build something, manipulate materials, or carry out experiments (1999, p. 171)."

Multiple Intelligence (MI) theory has been used to structure school curricula with positive results. Gardner describes the results of Harvard's Project Zero research in forty-one U.S. schools which applied the theory for at least three years: "78 percent of the schools reported positive standardized test outcomes, with 63 percent of these attributing the improvement to practices inspired by MI theory. Seventy-eight percent reported improved performances by students with learning difficulties. . . . and 81 percent reported improved student discipline with 67 percent of these attributing the improvement to MI theory (1999, p. 113)."

Improvements to student test scores and attitudes have also been attributed to an educational approach that uses the "environment as an integrating context (EIC)" for learning. The State Education and Environment Roundtable (SEER), an assembly of representatives from 12 state education agencies, defined the term in a study of environment-based education programs in 40 U.S. schools. EIC learning is "a framework for interdisciplinary, collaborative, student-centered, hands-on, and engaged learning," that uses "a school's surroundings and community as a framework within which students can construct their own learning, guided by teachers and administrators using proven educational practices" (Lieberman and Hoody 1998, p. 1).

The report details results of comparative analyses of EIC and traditional students as well as of surveys, interviews, and other measures, and found:

"EIC appears to significantly improve student performance in reading, writing, math, science and social studies, and enriches the overall school experience. Students exposed to programs using EIC approaches often become enthusiastic, self-motivated learners. In addition to traditional subject-matter knowledge and basic life skills, EIC students gain a wealth of added educational benefits, including: a comprehensive understanding of the world; advanced thinking skills leading to discovery and real-world problem-solving; and awareness and appreciation of the diversity of viewpoints within a democratic society" (p. 2).

Another coalition, New American Schools, is implementing alternative school models to improve student learning. One is called Expeditionary Learning, an approach drawing from the principles and values of Outward Bound. Students collaborate on multi-disciplinary, project-based learning expeditions, which involve intellectual, service and physical qualities. One of its ten design principles, "The Natural World," integrates the landscape as both a stage for self-discovery and as a text with its own lessons. Expeditionary Learning Outward Bound is used in 65 U.S. schools, and independent studies of schools implementing this approach reveal improved student achievement and greater student and teacher motivation (<http://www.elob.org>).

Research on how the brain works also supports the learning potentials of these experiential approaches, as noted in an article on innovative school design:

"Researchers now know that while people are born with a fixed number of brain cells, the synapses - or connections - between those neurons multiply in response to new experiences, particularly in childhood. Learning occurs when fresh synapses sprout, or when existing connections are modified in response to new information. . . . Learning by doing rather than merely by listening to lectures or watching demonstrations - appears to build these synapse networks most effectively because it engages all the senses" (Carrns 1997, p. B1, B12).

The nonprofit organization, Second Nature, offers another validation in its support of experiential learning in higher education that relates to institutions' campuses and surrounding communities. Second Nature's vision statement notes: "Educational

psychologists tell us that we retain 80 percent of what we do as opposed to 10-20 percent of what we hear and read." If this is true, then outdoor places that enable sensory rich, experiential learning should serve as essential resources for all schools and curricula (and may you retain 10-20 percent of this paper!).

2.2.2 Environmental education and school landscapes

David Orr states that "all education is environmental education. By what is included or excluded, emphasized or ignored, students learn that they are a part of or apart from the natural world" (1992, p. 90). In the US, thirty states require environmental education in their curriculum (D. Holmes 1998). While trips to environmental education centers may expose children to inspiring natural systems, such experiences are often disconnected with the natural environments and processes found in their immediate, everyday settings. Making connections requires not only committed teaching approaches, but also enriching places that are literally just outside. As a curriculum component, then, environmental education should influence the development of school sites as places for learning.

To have authentic value, children's understandings of place must emerge from sensory-rich experiences. Rachel Carson observed the importance of such experiences:

"If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused - a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love - then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning." (1956, p. 45).

David Sobel, in his book Beyond Ecophobia: Reclaiming the Heart in Nature Education, presents an educational approach that relates children's developmental stages to their evolving relationships with nature. He notes that "formative years of bonding with the earth include three stages of development. . . early childhood from ages four to seven, the elementary years from eight to eleven, and early adolescence from twelve to fifteen" (1996, p. 11). Sobel has collected and analyzed neighborhood maps drawn by children of varied cultures, interviewed and toured with them. Distinctive features within these groups ground his educational recommendations:

- **early childhood** - focus on building empathy with nature, particularly animals. Sobel describes the affinity young children have for animals, which can build strong emotional bonds, as well as engage imagination and role-playing.
- **elementary school years** - exploration of the landscape is key. Given this group's fascination with what lies beyond their familiar range, Sobel describes field studies of streams or watersheds that link the experience of a local place with expanding scales and processes.
- **early adolescents** - social relationships are essential, and can galvanize social action. In this stage leading to adulthood, adolescents need to realize their potentials to interact with and affect their society.

While relating to specific ages, Sobel states the proposed techniques are not mutually exclusive. Yet in drawing from children's developmental stages, his approach also suggests what landscape qualities are needed to facilitate learning.

In Natural Learning, Robin Moore and Herb Wong describe three "domains of education" (1997, p. 195-6) that should be supported in the design of school landscapes:

- **informal education** - encompasses all learning from a child's daily experiences, of which play is a central quality.
- **formal education** - characterized as the familiar context of a teacher presenting material to children in a class context.
- **nonformal education** - defined as a bridge between these two forms, where resource people may facilitate learning in non-classroom settings, such as natural areas and community facilities.

Education outdoors can draw from a host of pedagogies and goals, ranging from conservation education to civic responsibility. Whether encountered through informal play, nonformal activities, formal instruction - or preferably a combination all three - school landscapes are immediately accessible and available places for learning. The research of alternative learning approaches suggests that these landscapes are most meaningful if they provide varied hands-on, interactive opportunities to experience the nature and cultures of one's immediate and larger community (figure 4). These qualities are discussed in greater detail in Section 3.



figure 4

A student examines a fern growing in his school's urban forest.

photo by: Dale Lang

2.3 The Need for a Modern Red School House

Schools historically were centers of community life, a role embodied in the icon of the "little red school house." As school design has become more a series of formulas and facilities specifications, the resulting schools have become less connected with the life of their communities. A contemporary icon of schools may be represented as a one-story building isolated from the community by chain link fence and acres of grass. Yet economic, social and political conditions - including fiscal efficiencies, life-long learning

programs, community revitalization, and innovative teaching and leadership - are fostering new relationships among schools and their surrounding communities. These relationships create a dialogue where student learning occurs in the community and the community extends into the school.

Learning that occurs in a community context gives students unique skill-building opportunities. Educator John Abbott observes that the community is a critical setting to build essential competencies: "the ability to synthesize, to solve problems, to deal with ambiguity and uncertainty, and especially, to be creative and personally enterprising" (1995, p. 8). He notes that while the old competencies of "numeracy, literacy, and an ability to communicate" can be taught in a classroom, these newer ones cannot.

In Schools that Work: America's Most Innovative Public Education Programs, George H. Wood demonstrates the values of community-based learning. Wood notes that when students learn in their community, they learn skills as well as learn that their actions can make a difference. Wood provides vivid examples of the opportunities and challenges of using "the community as a classroom." He describes an elementary school teacher taking her class on walks each week and integrating their experiences and found objects in curricula. He traces the changes at a high school where administration planned to drain a marsh for athletic fields. A teacher who used the marsh for classes opposed the plans, and as the debate mounted, current and former students joined in. Students organized petitions, reported progress in their school newspaper, and painted a mural to highlight the cause. Once the decision not to drain the marsh was achieved, students and local scouts planted the area and the district funded a plan to develop it as a nature study area. Additionally, the student activism formalized into "Students for a Better Environment," a group that has effectively taken on other environmental challenges in the larger community.

While communities become a part of school learning environments, there is growing momentum to again make schools centers of the community. Community educators work towards "lighted schoolhouses" - schools open beyond the normal class day for other learning programs, recreation and social activities that serve the surrounding community and its needs (Decker and Boo). Missouri's statewide Caring Communities program provides such opportunities, which the Independence School District has applied to serve family and community needs, such as: full-day childcare; after hours sports, classes, and meetings; and libraries and media centers open at night for all to use. The district provides referral services for children's needs, and has on-site health clinics for students and parents at two of its elementary schools (Umansky 1999).

To initiate a "national conversation" on how to involve parents and other community members in building schools and how to make schools centers of the community, the U.S. Department of Education hosted a National Symposium on School Design in October 1998. Prior to the symposium, school and design professionals developed six principles. These principles address both the nature and process of schools as learning environments:

- “1. Enhance teaching and learning and accommodate the needs of all learners....

2. Serve as the center of the community....
3. Result from a planning/design process involving all stakeholders....
4. Provide for health, safety and security....
5. Make effective use of all available resources....
6. Allow for flexibility and adaptability to changing needs" (1999).

As the roles of community and school overlap to create what is widely being called "a community of learners," opportunities emerge for enriching school sites and surroundings. Innovative partnerships can enhance the qualities, use, and care of school landscapes, as described below.

2. 4 Innovative Examples

While often begun by a dedicated, visionary individual, the transformation of school sites into ecologically rich learning environments requires broad-based and ongoing support. Policies across jurisdictions and at several levels must foster, expand, and sustain such efforts. Innovative funding and curriculum programs must provide tools for transforming and using the site. An inclusive process that fosters creative partnerships among all stakeholders - students, teachers, staff, administration, parents, neighborhoods, and community organizations and agencies - is key.

The following three examples describe innovative policies, programs, and partnerships. While unique in conception and realization, they share common features, including:

- leadership from a respected and committed individual and group;
- creative partnering of people, resources, and ideas;
- multiple benefits valued by a spectrum of stakeholders;
- perseverance to refine and realize goals; and
- policy-based, financial, and/or material support from school, community, and non-profit institutions and individuals to initiate and sustain the vision.

2.4.1 The Edible Schoolyard, Martin Luther King Jr. Middle School, Berkeley, CA

The Edible Schoolyard is an excellent example of a concerned entrepreneur's partnering with a school to transform its landscape, integrate experiences with curriculum, and generate support for similar initiatives at other schools. A once unused acre of asphalt at Martin Luther King Jr. Middle School in Berkeley, California, now flourishes with organic fruits and vegetables that enrich the minds and bodies of some 900 students (Urban Ecologist 1998, Kligman 1998). This happened because Chez Panisse restaurateur Alice Waters passed the school each day and was dismayed by its derelict condition. After reading about her concerns in a newspaper article, the school's principal

contacted her. A lunch meeting followed that led to an expanding partnership and program, The Edible Schoolyard.

The transformation began with a planning charrette in early 1995, which included landscape architects, teachers, and food growers (Comnes 1999). Waters obtained support from the Center for Ecoliteracy and Senator Barbara Boxer, set up a business plan, and renovated the school's unused kitchen. The asphalt was removed, and a planting celebration occurred in December 1995. The garden's first harvest took place in 1996, with a garden coordinator overseeing volunteers and students. In the spring of 1997, a chef was hired to teach students cooking. The Edible Schoolyard has become an exciting attraction for students, all of whom take part in its care (figure 5). Along with vegetable beds and orchard, the garden contains a rock creek, kiwi vine gazebo, adobe bread oven, and compost system. Teachers are using the garden experiences for an ecological curriculum revolving around math and science classes, while the cooking lessons are linked with humanities, math and science. Staff and community volunteers work with students in maintaining the garden.



figure 5

In the Edible Schoolyard, student experiences in cycles of gardening are integrated with curricula.

photo by: Ene Osteraas-Constable, The Edible Schoolyard

Envisioned by Waters as a national model for a holistic curriculum and physical environment that engages children, teachers, and community members, the Edible Schoolyard has resulted in other initiatives. In 1996, Waters established the Chez Panisse Foundation to raise awareness and funding for this and similar projects that "teach sustainability, strengthen community, and develop responsible stewards of the land through the sensual experiences of gardening, cooking, and sharing food" (1997 Annual Report). And the success of the Edible Schoolyard has influenced institutional policy to expand the program. In the fall of 1999, the Berkeley school board "unanimously passed a resolution that provides all children in the district with access to organic food in their lunch programs; and that every new school be built with a kitchen *and* a garden" (Knickerbocker 1999, p. 29). By the year 2000, 12 of Berkeley's 17 schools have established gardens (Green 2000).

2.4.2 The Boston Schoolyard Initiative

The Boston Schoolyard Initiative, an innovative six-year partnership between the City of Boston and a collaborative of 11 local foundations, is revitalizing neglected schoolyards and their surrounding communities. Kirk Meyer, director of the Boston Schoolyard

Funders Collaborative, writes that this Initiative "is a model for promoting community-driven sustainable development, environmental stewardship, responsible public policy, and outdoor experiential education in the Boston Public Schools." (1998, p. 8). By the end of its fifth year, the program was working with 56 of Boston's 128 schools, and plans to assist more in the coming years (Meyer 2000).

School improvements are envisioned and undertaken using the following inclusive process. A school applies for an organizing and planning grant from the Collaborative. This grant is used to hire a community organizer who forms a stakeholder group through outreach to school constituents, neighbors, and community groups. The City provides \$2 million each year for the program's schoolyard design and development budget. A project manager from the City's Department of Neighborhood Development assists each school stakeholder group in selecting and working with a landscape architect for a schoolyard masterplan. Through a series of meetings, the landscape architect identifies key issues for the school and its surrounding neighborhood, develops a series of alternative schematics for review, and forges a single masterplan. The schoolyard group then prioritizes features of the masterplan to fit their construction budget.

One of the challenges renewed schoolgrounds face is adequate ongoing maintenance. The School Department and local schoolyard "Friends" groups have jointly developed a maintenance protocol. The Collaborative has established small matching grants to school site councils as "maintenance sustainability awards" and pilot grants to local community development corporations to develop schoolyard sustainability strategies. Partnering multiple constituents for extensive schoolyard use also is intended to foster a "friends of the schoolyard" group to assist with maintenance (figure 6).



figure 6

A garden created on part of an East Boston elementary school is tended by neighborhood children through a summer program with Boston Urban Gardeners.

photo by: Kirk Meyer, director, Boston Schoolyard Funders Collaborative

The learning potentials of these schoolyards have been strengthened through teacher training and curriculum development. The Boston Recycling Office offers workshops for teachers on schoolyard composting. The Collaborative provides professional development grants to teams of teachers, stipulating they share their experiences with

others. The Collaborative seeks to incorporate outdoor learning as part of the curriculum at School Department's official center for teacher training.

2.4.3 Seattle's Grey to Green Program

Seattle's Grey to Green Program was created in 1999 to help the city's schools and surrounding neighborhoods redevelop school grounds for both school and community benefits. Agency partners are the city's Department of Parks and Recreation, Department of Neighborhoods, and Seattle School District, with funding and coordination through Parks. The program has an \$800,000 budget for its first two years, with school/community applicants receiving up to \$70,000 as a match for community-based contributions and volunteer time (Dane 2000).

The Grey to Green Program is designed to complement existing School District and Department of Neighborhoods programs, and foster school and neighborhood partnerships in all phases. An interested group must contact the School District's Self-Help Program to initiate the process. Funding for conceptual designs and other costs may be obtained through the Department of Neighborhood's matching fund program, which matches community-raised donations or services. When a conceptual design is developed, groups may apply for funds from the Grey to Green program. Eligible projects include new or improved play areas, learning gardens, habitat restoration and preservation, or active recreational opportunities. Selection criteria include:

- demonstrated support from school and community constituents,
- a community or neighborhood match of donations or service,
- a long term benefit to the school and community,
- a developed design that has been reviewed by the School District, and
- a plan for ongoing maintenance (City of Seattle, Department of Parks and Recreation 1999).

The first awards were made in 2000, and five schools have program-supported construction projects underway or completed that demonstrate a range of improvements (Dane 2000). One school, T.T. Minor Elementary, is creating children's learning gardens (see Section 5.1). Another, Dearborn Park Elementary, is applying program funds to wetland restoration and a boardwalk (see Section 5.2). A third school made improvements to its front entry landscape. The other two awards focus on improved recreational opportunities, with one school developing a grass field and play structure in place of asphalt, and the other providing landscape and play improvements to an asphalt playground. Given the comprehensive scope of collaboration, planning, and matching support required for Grey to Green Program support, both the physical and social community of schools and neighborhoods may be enriched through the process.

3. DESIGN FOR LEARNING EXPERIENCES

School landscape design can foster abundant opportunities for play, nonformal and formal learning. This section provides an overview of four key types of experiences that enrich learning, six design qualities that facilitate these experiences, and five themes of landscape character that integrate these design qualities for place-based learning. The discussion draws from a review of related articles in the past ten years of Landscape Architecture magazine, a literature review, and my research, teaching, and writing undertaken with colleagues, design students, and children. Literature references are made for the reader to explore in greater depth and perspective.

3.1 Key Experiences and Design Qualities

In school landscapes, spatial and material design qualities need to support meaningful experiences for cognitive, social, emotional, and physical development. Reggio Emilia educators "speak of space as a 'container' that favors social interaction, exploration, and learning, but they also see space as having educational 'content,' that is, as containing educational messages and being charged with stimuli toward interactive experience and constructive learning" (Gandini 1993). This view offers a framework for defining key experiences and qualities that enhance learning in the landscape.

This discussion draws from the author's experiences and collaborations (including Johnson and Hurley 1999) and varied literature. Three recent publications in particular have informed this section and are highly recommended for further reading:

- Natural Learning The Life History of an Environmental Schoolyard, by Robin C. Moore and Herb H. Wong;
- Landscapes for Learning Creating Outdoor Environments for Children and Youth, by Sharon Stine; and
- Special Places, Special People The Hidden Curriculum of School Grounds by Wendy Titman of Learning through Landscapes.

The following interrelated four experiences and six design qualities may be considered as guides to developing school landscapes that enrich learning. One may ask whether, where, and how well the following experiences are supported and design qualities are contained or expressed in a designed landscape.

3.1.1 Experiences

Learning is enhanced when multiple senses are engaged, when children actively take part rather than passively listen, and when learning occurs in a setting that is part of daily life. The following experiences are supported in enriching landscapes:

1. rich and varied sensations

- Learning experiences engage the senses of touch, sounds, smells, tastes, and sight with opportunities to discover changes and variety for each sense.
- Children learn through relating space to their own body and movement, engaging large and fine motor skills as well as cognition (Olwig 1990).
- Creative learning and play intensifies the senses through imagination, surprise, or discovery. Framed views, attention to details, magnifying the minuscule or becoming another life form, can foster the sense of wonder that Rachel Carson described for children's experiences in nature (1956) (figure 7).



figure 7

A wooded slope provides multiple opportunities for experiences of sensation, movement, and imagination.

photo by: author

2. abundant choices

- Varied activities foster the development of different intelligences. These range from active to passive, organized to individual, physical challenge or risk as well as mastered activities that represent security.
- Choice in social interaction allows one to be part of, observe, or remain separate from a group. Stine observes that providing children with choices in social interaction is essential, given the school environment's significance in a child's daily life (1997). Children have echoed this need for choice, particularly for places to find solitude amidst daily activity (Titman 1994, Johnson 1999).
- Alternatives where children move through, over, under, around spaces and use different forms of moving, such as crawling, walking, running, or cycling, offer developmental challenges as well as enhanced ways of knowing a place.

3. opportunities to make changes

- Children need to create and change their environments (Hart 1979, Moore 1986, Stine 1997). This process of constructing or de-constructing gives empowering experiences, be it in a garden, pond, fort, or dirt mound.
- Opportunities to interact and experiment with objects and materials are essential to enriched learning. As Simon Nicholson articulated in his theory of loose parts: "In any environment, both the degree of inventiveness and creativity, and the

possibility of discovery, are directly proportional to the number and kind of variables in it." (1971).

4. personalized sense of place

- Opportunities to choose from and be in a range of comfortable settings help foster personal meanings and emotional attachment. Such settings may be ones that mitigate the climate, allow children to explore yet feel safe, and afford choice in where to go and with whom.
- Opportunities to be in spaces that one can claim as one's own, as well as places that can support community traditions, build personal connections with place. In Natural Learning, Moore and Wong discuss making a sense of place, including the incorporation of meaning-laden found objects, creation of personal "nooks and crannies", and participation in community gatherings that become rituals.
- Places and features that are named by children reflect imaginative and emotive attachments developed through experiences over time, and demonstrate personal understandings of a place.

3.1.2 Landscape qualities

Design qualities of enriching landscapes create containers for desired experiences and offer layers of educational content that relate curricula with the local context. The following six qualities seem essential:

1. natural and cultural systems

- Places and objects enable discovery of how natural and cultural elements interact as parts of a system, such as stormwater supports the school landscape, where it goes, and how the hydrologic cycle is revealed beyond the school landscape.
- Natural and built elements are manipulable; Stine describes the importance of both natural and people built elements in the school landscape, underscoring the need for children to explore both process and product (1997).
- Earth, water, and vegetation are present, in varied expressions, textures, and sizes, to engage the senses and imagination.
- Daily weather and seasonal natural patterns are revealed through elements such as sun dials, vegetation, wetlands or water catchment systems.
- Cultural or historic elements are included which relate to neighborhood or community places, activities, or events and which celebrate learning for members of the school and local community. For example, a garden that contains plants from the home countries of students and their families can inspire stories, curricular activities, and community events. Sculpture or seasonal banners may also provide insights.

Children's preferences for nature and natural elements, are well-documented (Francis 1988, Freeman 1995, Moore 1986, Stine 1997, van Andel 1990). Water, a

universal source of fascination, is an essential component that often is challenged by liability issues. Creative approaches are needed to include water, be it as a wetland in a habitat area, a bubbler in an interactive sculpture (figure 8), mist spray in a garden, or even a channel for rain water to move along a paved surface.



figure 8

This ornamental fountain at Seattle's Belltown Peapatch offers opportunities to see, touch, and hear the water as it bubbles onto a dish and splashes through the grate below. This piece is a collaborative creation: Myke Woodwell designed and constructed the garden solar fountain; Louie Raffloer designed and forged the iron work, and Kay Kirkpatrick designed, created and installed the ceramic tiles.

photo by: University of Washington Center for Environment, Education, and Design Studies

2. connections

- Views from classrooms that contain diverse natural and cultural features, create opportunities for immediate curricular connections.
- Transitional indoor/outdoor spaces, such as protected terraces provide places for groups to gather or study.
- Although school entries and edges need to address security, they also must afford visual, if not physical, access with surroundings. Adjacent public open space should be easily accessible for field studies.
- Places within the school landscape should encourage desired neighborhood interaction, such as an entry courtyard for informal gatherings or community events.
- Plant species and built elements relate to the site's microclimate, neighborhood, community, and region. Thus, school landscapes enable children to develop an ecological literacy grounded in their immediate setting with tangible and abstract connections to the community and region.
- To enable study of recycling common materials and more sustainable development approaches, reused or recycled materials and sustainable design principles should be present and made explicit.

- Connections made to the greater biosphere with elements featuring the air and sky, such as framed views, wind-activated materials or sculpture.

In Natural Learning, Moore and Wong describe explorations of seasonal and daily patterns, including those of air space. They note the richness of a "sky sculpture" out of silver mylar strips hung across the Environmental Yard: "It became a glittering pulse of bobbing columns of light suspended in an ocean of air, marking the faintest breezes with languid reflections, at other times dancing before the setting sun. . . and emitted hard, crinkling sounds when blown horizontal by strong Pacific winds." (1997, p. 79).

3. legible and complex image

- Research by environmental psychologists Stephen and Rachel Kaplan and Robert L. Ryan shows that legible and complex landscapes address people's needs to both understand and explore their surroundings (1998). This team's research using environmental preferences of landscape images revealed that preferred two-dimensional images contained what they defined as coherence and complexity. Similarly, the three-dimensional inferences of these images suggested what they termed legibility - which includes orientation by memorable features, and mystery - which invites discovery of what lies beyond (figure 9).



figure 9

A formal gate and plantings frame this school habitat entry, with a picnic table inviting use. While this image offers legibility, the composition of plantings create a sense of mystery regarding what lies beyond them.

photo by: Diane Pottinger

- The cognitive structure identified by Lynch in The Image of the City provides a framework to design for legibility that also applies at a site scale: paths, nodes of activity, edges, districts, and landmarks. This framework correlates well with findings that children tend to orient themselves by activity and value sensory-rich qualities (Olwig 1990).
- Complexity and mystery in materials, objects, and spaces afford children developmentally enriching choices. They may draw upon their understanding of known places, yet also seek challenges in less familiar, or changing, settings.
- Daily and seasonal changes in the landscape's natural and cultural qualities contribute to complexity and create opportunities for greater ecological understandings.

The spaces of many school sites are very legible - a hedge lined street edge, a chain link bordered play field, and a play structure set in an island of bark mulch - yet these spaces provide little opportunity for discovery or meaningful choice. Legible images

also requires complexity at varied scales, in materials, and through temporal change, to exhibit what Jane Jacobs described as "intricacy" - a quality that invites returning to a place with opportunities for fresh insights (1961).

4. varied scales

- Varied scales of paths and places support a range of functional, social, and personal meanings. Teachers may select spaces appropriate to group sizes and activities. Large gathering places can serve a large class or community and school events. More private and intimate scaled places allow for small group or individual reflection and study (figure 10).



figure 10

This courtyard offers abundant choices for sociability, with varied scales of spaces defined by natural and built elements.

photo by: University of Washington Department of Landscape Architecture teacher workshop images

- Child-sized places that provide for prospect and refuge are particularly valuable for imaginative play and solitude (Author 1999, Kirkby 1984, Moore and Wong 1997, Stine 1997). Stine identifies the value of "perching places," (1997) which correlates with Jay Appleton's prospect-refuge theory that we find pleasure in places that offer the ability to see and not be seen (1996). Moore and Wong describe the value of affording "nooks and crannies" for children to personalize and develop a sense of ownership for the schoolyard (1997). These places included elevated logs, rocks, and clusters of plantings.
- Varied topography and structure levels define a range of spaces, and afford choices in movement, sociability, and activity (Adams 1989, Moore and Wong 1997, Stine 1997).

LTL author Eileen Adams notes: "Children . . . welcome variations in topography, changes of level, variation in height, slopes, terraces, steps and mounds. These provide a change of outlook and vantage point, a chance to move in a different way, to vary the position of the body in space, to change the social situation. They can be

the focus for all sorts of games and encourage an active involvement with the environment" (1989 p. 18).

5. flexibility

- Open-ended, flexible, or unfinished spaces provide opportunities for children's imagination and creativity to flourish as well as for alternative activities within a curriculum.
- When elements can be moved, changed, and re-created, children can engage in creative play and discovery, bringing to life Nicholson's theory of loose parts.

If conceived as a commons, the meaning of a flexible space may change as "actors" and "props" that claim it at a particular time animate it. Such space may serve as a performance space, a festival site, a student construction area, or a gallery at different times. The space may be reserved as children's' adventure playground whose unfinished appearance is accepted, understood, and valued.

6. aesthetic quality

- The poetics and beauty of places engage the mind and spirit. School landscapes need to be designed to make the site's inherent and designed beauty accessible to children.
- For children, beauty is not simply experienced as a visual composition, but as a setting that engages all the senses, particularly at the detailed, close to the ground scale (Olwig 1990) (figure 11).



figure 11

School entry gardens may provide a lush composition of colors, textures, and scents.

photo by: Diane Pottinger

- Places are needed for children to create, enact and display their own expressions of art, such as a changeable gallery and/or performance space.

The predominance of asphalt and play fields on schoolyards today impacts students beyond their aesthetic appreciation. LTL researcher Wendy Titman describes the cultural meanings that children infer from their schoolyards in Great Britain as a "Hidden Curriculum". She found this Hidden Curriculum "affected children's attitude and behaviour, not only in relation to the grounds or whilst children were using them, but in terms of the school as a whole" (1994, p. 55). Much like the college student's reading of an asphalt Seattle schoolyard described at the beginning

of this paper, Titman relates children's views that "tarmac or concrete was all their school could afford and read from this that the tarmac was a measure of the worth of the school and of themselves as part of it" (1994, p. 33).

3.2 Themes for Landscape Character

Aside from the standard formula of play equipment and ball fields, school landscapes that are designed as learning environments embody the qualities described above, offering enriched learning experiences. These landscapes express a unique sense of place that relates to their context, yet generally exhibit certain themes in their character. Five themes are discussed here. Two of these themes - habitat and gardens - serve as a foundation for which the others - sustainability, cultural and artistic expressions, and interpretive features - give added layers of meaning. The themes provide a framework for design that fosters learning through varied interpretations of place.

3.1.1 Habitat

Schools across the US are creating or restoring schoolyard habitats (figure 12). As settings to attract wildlife, habitat projects may be as simple as a grouping of butterfly-attractive plants, or as extensive as an urban forest that connects with a regional open space system. For example, Professor Dan Donelin, FASLA, and colleagues at the University of Florida developed a schoolyard ecosystem program that has been widely used across that state. The program's workshops with teachers provide curricula and illustrate how they can create habitat with their students ("Schoolyard Ecosystems" 1994). The NWF's Schoolyard Habitat program serves as a national resource, providing "how to" information as well as grants for implementing habitat.



figure 12

A school's courtyard is enriched as habitat.

photo by: Diane Pottinger

Schoolyard habitats can provide multiple benefits, particularly if connected with their surrounding context as part of a larger ecosystem. For example, connections of school landscape drainage patterns with surroundings extend learning possibilities beyond the immediate school site. A restored wetland, surfaced stream, or stabilized hillside on the school grounds makes the surrounding watershed an integral source of inquiry. Such habitat improvements enhance local ecological quality, extend formal educational

opportunities, and serve as ever-changing places for play and solitude. Additionally, as an open space for the community, they may serve as a catalyst for enhancing the surrounding community's ecosystem.

In the 1970s, the 1.5 acre asphalt schoolyard of Washington Elementary School in Berkeley, California, grew into a diverse natural area including ponds, a waterfall and stream, a pine grove and chaparral hill, along with play areas and structures, and a meeting space. Moore and Wong (in Natural Learning: The Life History of an Environmental Schoolyard, 1997) describe the variety of natural elements children engaged on the site, how these were integrated with curriculum, and how student and community participation in transforming the site fostered a sense of community.

This transformation demonstrates that the design process of creating or enhancing habitat on existing school sites holds experiential learning potentials (see Section 2), as does the "finished," yet continually evolving, place. For example, as part of the design and construction process, children may assist with aspects of demolition and construction, remove invasive species, plant native plants, and observe the changes to the system over time. Students may continue to care for the habitat through formal stewardship or mentoring programs, as well as by a personal attachment to this place. Students at Seattle's Dearborn Park Elementary (see Johnson and Lang, 1997, Johnson and Summers, 1998, and case study in Section 5.1) care for an adjacent urban forest, and older students mentor younger ones. When visiting this forest with Dale Lang, student guides picked up trash scattered along the trail and questioned why people would drop it (figure 13).



figure 13

Students gather trash as they guide visitors through the school's urban forest.

photo by: Dale Lang

3.2.2 Gardens

Although some schoolyard habitats may be characterized as school gardens, the term is used here to define areas managed specifically for agrarian and/or aesthetic intentions (figure 14). School gardens were widely developed in the US during the turn of the 20th century and are receiving a resurgence of popularity. In a study of early 20th century school gardens, Brian Trelstad places them in the context of educational reform and other social, political, and environmental changes (1997). He traces a myriad of causes for the decline of school gardens in the 1920s, including the loss of a national funding program,

growth of recreational programs for children, improved urban conditions, and lack of support among educators to integrate them with the curriculum. While several of these conditions still exist today, a number of schools are developing gardens, with curricula and support from varied sources. For example, California's education system is committed to developing gardens in its 8,000 schools, and has 1,650 in place already (Raver 1999).



figure 14

Students care for a mini-orchard at an elementary school in Jamaica Plain developed through the Boston Schoolyard Initiative.

photo by: Kirk Meyer, director, Boston Schoolyard Funders Collaborative

Gardens offer a range of formal learning potentials as well as community-building opportunities. The Edible Schoolyard in Berkeley, California (see Section 2.4), is integrated with curricula through an environmental education focus. The program also focuses on sustainable practices, and includes a holistic understanding of food production, eating, and composting. In addition to garden staff, teachers, and students, local volunteers take part in caring for the garden.

3.1.3 Sustainability

Sustainability may be an overarching goal for habitat and garden design themes and may serve curricula while guiding decisions for site development, materials selection, and management practices. For new school development, sustainable planning and design means a change from standard site clearing to an approach that seeks to preserve and enhance existing vegetation and drainage patterns. On existing school sites, restoration of habitat is undertaken. These efforts support local ecosystems, and where possible, help connect open space corridors. Sustainable approaches to stormwater management can conceptually inspire a school's masterplan, and in practice may reduce impervious surfaces and capture and recycle stormwater on-site. Drawing from the site's ecology, sustainable design means using plant species and groupings that offer habitat and don't require irrigation, as well as building structures made with the recycled and non-toxic materials. Sustainable management practices reuse or recycle materials on-site. Examples range from a simple compost area to stormwater management systems such as cisterns for clean runoff or plantings for biofiltration. Such sustainable practices create an interactive laboratory for student and community learning.

Leadership in sustainable design is well underway at higher education facilities. The NWF's Campus Ecology Program includes publications of innovative practices used at colleges and strategies for change, a newsletter, and directory. At Oberlin College, Professor David Orr has spearheaded the collaborative development of the Center for Environmental Studies, a facility that will serve as an educational model of green design technology. The Center's landscape also will offer lessons, with a wetland to capture stormwater run-off, an organic garden and orchard, and indigenous plants (Masi 1998).

The University of Washington's Garden of Eatin' is an example of sustainable principles applied in a courtyard space. Landscape architecture professor Daniel Winterbottom and lecturer Luanne Smith led a design-build studio in 1998 that transformed a parking area into an edible garden and gathering place (figure 15). The courtyard features a cistern that gathers rainwater from the adjacent building roof and uses this water for irrigation. The cistern's overflow system features a playful series of troughs with fish crafted from found objects. Recycled materials are used throughout the garden, including rubble of the site's former concrete paving as a retaining wall and recycled plastic lumber used for a ramp (figure 16).



figure 15

The University of Washington's Garden of Eatin' demonstrates use of stormwater catchment and reuse, recycled materials, and edible plantings.

photo by: author



figure 16

The Garden of Eatin's ramp of plastic timber leads to a secluded sitting area and secondary building entrance.

photo by: author

3.1.4 Cultural and artistic expressions

School grounds may express the artistic and cultural diversity of its student body and community through "artist in residence" programs or similar initiatives. These may inspire the creation of objects such as sculptures, entryways, tiles embedded in walls, paving, or seating and/or the character of a garden, performance space, or entry (figure 17). A "sister city" or "sister school" program may also inform particular features, events and studies, such as a garden displaying native plants or child-created artifacts from that sister city or school. Such programs hold valuable learning opportunities if students participate in the design and construction of the pieces.

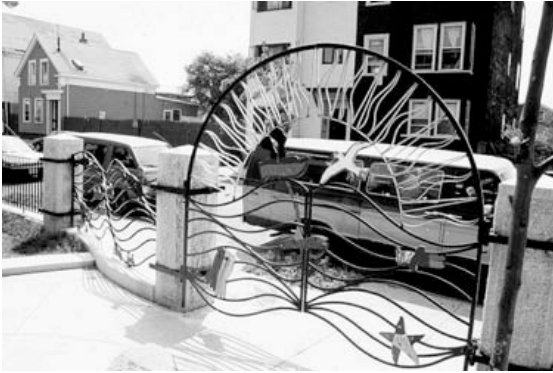


figure 17

This ornamental schoolyard gate was designed by artist John Tagiuri with students at East Boston's O'Donnell Elementary School through the Boston Schoolyard Initiative. artwork © John Tagiuri, 1998.

photo by: Kirk Meyer, director, Boston Schoolyard Funders Collaborative

Seattle's Dearborn Park Elementary school has many Asian American and African American students, and the school landscape features an "International Garden" where vegetables from school families' homelands are grown. During the summer months, student volunteers tend the garden. The plants give tangible cultural connections, as families bring traditional dishes to the school community's annual harvest festival.

3.1.5 Interpretive features

Although interpretive exhibits are more commonly associated with parks or museums, these can also give meaning in school sites. Examples include historic natural and cultural artifacts that can enrich students' and the community's understandings of place and time (figure 18). Structures can be designed for manipulation in formal lessons or creative play. Interactive equipment to measure weather, generate energy, or create music offers other possibilities. Additionally, spaces can be designed to be animated for particular seasonal events. Oberlin College's Environmental Studies Center features a solar plaza, where calibrated shadows will mark the solstices and equinoxes (Ingalls 2000).



figure 18

This neighborhood map at a South Boston elementary school playground offers playful and curricular interpretations of place and scale. The map is part of the schoolyard's redevelopment designed by Wallace Floyd Design Group.

photo by: Kirk Meyer, director, Boston Schoolyard Funders Collaborative

A recent school landscape project by Robin Moore includes an exciting interpretation of cultural history (Raver 1999). In 1995, Moore began working with Southern Pines Elementary in North Carolina, to create the Blanchie Carter Discovery Park on the school's four acre site. An extensive path system winds through play and habitat areas to

a student-built log cabin and campfire circle reflecting local culture. With parents' guidance, third graders constructed the cabin using 18th century type tools. They cut logs for the campfire circle, which has become a focus for stories, gatherings, and play. It is easy to imagine how the construction and campfire experiences immerse children's senses with the history of this place and its people.

4. LEARNING AS PART OF THE DESIGN PROCESS

Learning in school landscapes derives from intrinsic and designed qualities as well as participation in the design, or place-making, process. This section focuses on how that process can be inclusive, insightful, and empowering. Students, teachers, administration, parents, and the surrounding community need to be involved in the site (and ideally the building) design and development. It is critical that the designer's scope of work permits and encourages meaningful participation by all constituent groups. An inclusive design process can connect creativity, energy, and support for the school landscape's environmental design and educational potentials. Values established through such a process not only benefit the design, but ensure its continued use and success. This section presents insights from literature and examples of engaging the school's context and children's participation. The first part describes methods for engaging people and pedagogy, and the second part discusses methods for children's participation in the design process.

4.1. People and Pedagogy in Place-Making

Each school contains a unique context of pedagogy and people that frames the potentials of the school landscape. To maximize site opportunities and resources, the design process needs to draw upon and introduce ideas in ways that are responsive to this context.

4.1.1 People and participation

Although involving a spectrum of school and neighborhood constituents may be daunting to a design team, this effort can identify opportunities for design features and the project's budget that otherwise may not surface. Some school site development programs, such as Boston's Schoolyard Initiative and Seattle's Grey to Green program, already require such broad-based involvement. Moore and Wong (1997) describe a participatory framework of three concentric circles of community that need to be addressed:

- **users** - those who do, or may, use the school, including students, teachers, parents, and neighbors;
- **participants** - people and organizations who may become users or detractors; and
- **networks of interest** - people involved in similar projects who want to share ideas.

The participatory design literature provides valuable insights and methods for engaging such diverse groups. Within landscape architecture, educator Randy Hester has developed several excellent publications on participatory design, including the [Community Design Primer](#). While the designer's scope defined by the client and budget may limit the extent of community participation in design, school or community groups

may take on particular activities such as surveys or behavior mapping to inform the process. The designer may draw upon these findings to focus interviews, workshops or charrettes, and meetings with a representative advisory group.

Recent school design literature describes participatory approaches that expand outdoor learning into the community and draw the community into the school. Like Moore and Wong (1997), architect and educator Anne Taylor advocates and involves children as key participants in a design process. For over twenty years, Taylor and architect George Vlastos have worked with diverse groups to create learning environments that integrate with curricula as a "three-dimensional textbook" (1993). Their process draws from human developmental goals, curricular needs, and the site context, including community needs.

Noted school design consultant Steven Binger, AIA, uses a participatory planning process by mixing students, parents, educators and community members in theme-based groups (Fielding 1999). He forms six groups to investigate "community infrastructure": physical, educational, social, cultural, economic, and organizational aspects. The theme groups are then mixed, becoming in Binger's words a "huge discovery process, where the groups are discovering information in their community." A technique he uses to facilitate discovery is treasure hunts, where participants use treasure cards to describe a treasure in their community and suggest how it may be used for learning. This process reveals unique planning opportunities, and a network of people cooperatively learn about their community and the expanded potentials of learning environments.

Ideally, the involvement of diverse groups in the planning and design process will result in people who are committed to the landscape's development and maintenance. Their commitment may involve grant-writing and administration, planting, maintenance, or organizing community celebrations. Ground-breaking ceremonies and subsequent events help build a sense of community.

Woodridge Elementary School in Bellevue, Washington, provides an example of continued involvement by parents, teachers, and students, starting with a parent who spearheaded the transformation of a ditch at the school into a riparian habitat. She first met to discuss grants for native plantings with interested teachers and a parent who is a landscape designer. The landscape designer worked with school classes to brainstorm ideas for a school garden and discovered that every student's vision included water. This common interest focused the garden's ditch location and riparian design character. The parent who initiated the project wrote grant proposals and worked with the school district to obtain construction assistance. With multiple grants, the parent and landscape designer coordinated student volunteer planting events after a school district crew regraded the ditch and placed rocks along its banks. In the spring of 1998, the parent coordinated a habitat celebration with teachers to recognize participating students and supporters (figure 19). Initial watering and maintenance of the habitat was shared by student groups and parents, but a more formal adoption of portions of the habitat by classes is planned. Meanwhile, the parent and landscape designer continue with plans for a grant-funded interpretive shelter.



figure 19

Students, teachers, parents, and supporters gather to celebrate the new riparian habitat at Woodridge Elementary School.

photo by: author

4.1.2 Potentials through pedagogy

To realize a school landscape's formal learning potentials, hands-on learning approaches need to be supported and adopted by teachers and administrators, and understood and approved by parents and community groups. Typically, learning outdoors is assumed to be an extension of science curricula. However, other formal and informal learning opportunities need to be explored. Applications of outdoor learning to other curricula, such as math, writing, and the arts, can be undertaken through curricular programs (see Resources section) or developed by teachers. Early in the design process, resources should be identified that enable interested teachers to plan ways to use the landscape in their classes. Community groups and parents may take an interest in specific site features that enhance civic activities or play. Promoting a diversity of learning values and supporters can lead to richer environments; greater use and value in curriculum, play, and/or community-based programs; and on-going commitment to landscape quality. A positive example of such outcomes is discussed in the case study of Seattle's Dearborn Park Elementary School (see Section 5.2).

An example of a less successful process was experienced by landscape architect Kas Kinkead (1998). She participated in the design of a new elementary school where the school district and principal supported outdoor education and approved the design of a drainage feature as a habitat area with paths and a footbridge. Unfortunately, the prescribed design process did not include teachers. As a result, they were not prepared to use the habitat in their curriculum, but instead viewed it as a liability. They preferred the more familiar setting of paved space for play and ball games, despite earlier concerns of having too much unused paved areas.

4.2 Meaning and Methods of Children's Participation

Children's participation in the design and development of school landscapes often brings a myriad of benefits to their learning and to the design. Meaningful children's participation in the design process includes:

- building support with the client, as well as involved teachers and parents;
- involving children through classes, civic groups and/or informal formats such as community meetings; and

- commitment from the design team to engage children in developmentally appropriate formats throughout the process while making transparent the context of the project's scope, participants, decision-making structure, timeframe, and resources.

Different forms of children's participation, design and learning values, and methods are presented here. While the focus is on participation in the design process, children should be involved throughout the construction process and participate in sustaining the landscape. As described in Section 3, opportunities to manipulate environments are essential to their learning and development (Olwig, 1990), and may foster an ecological literacy.

4.2.1 Defining children's participation

Through extensive research and work with children in the planning and design of their environments, Roger A. Hart has developed a model that defines eight different levels of children's participation in projects. Using the metaphor of a ladder that Sherry Arnstein developed in 1969 to represent levels of adult participation, Hart describes eight rungs of a ladder for children's participation, with the lowest representing the least participation:

8. child-initiated, shared decisions with adults
7. child-initiated and child-directed
6. adult-initiated, shared decisions with children
5. consulted and informed
4. assigned but informed (social mobilization)
3. tokenism
2. decoration
1. manipulation (Hart, 1992, 1997).

Hart defines the first three lowest rungs as non-participation approaches. In "manipulation" and "decoration," children are consulted but do not understand the issues and are given no feedback on their contributions. With "tokenism," Hart notes that while children are represented, they are limited in the choice of subject, how they communicate, and the opportunity to develop their own opinions. A small group may be viewed as representing a larger group of children without having undergone a representative process (Hart, 1992, 1997).

Genuine children's participation is found in increasing levels. Hart characterizes "Assigned but informed ('social mobilization')" as settings where children are informed of the project's context and issues, but their action is assigned. In "consulted and informed," children understand the project's context and issues, contribute their perspectives, and are informed of results. The three highest rungs expand children's roles in the process and in decision-making. "Adult-initiated, shared decisions with children" offers deeper understandings of the project's process and limitations that affect choices and outcomes.

Hart characterizes the next rung, "child-initiated and child-directed," through activities found in settings such as adventure playgrounds, where children conceive of and develop their own environments. The highest rung, "child-initiated, shared decisions with adults" conveys situations where children recognize their own and others' competencies as members of a community and seek collaboration with adults to further their goals (Hart, 1992, 1997).

Hart's model is valuable in developing and critiquing approaches for children's participation in the design process. Without an understanding of the context and scope of a project, children are not true participants. Understanding a project's dynamics helps to de-mystify why certain outcomes occur. With increased awareness and roles throughout the design and development process, children can become vested constituents. Hart notes that an essential principle of children's participation is choice, where children are able to choose to participate, and are encouraged to do so at the highest level of their ability. While the scope of a project may limit some aspects of children's participation, aspects can and should be pursued that children conceive of and develop. Flexible, unfinished spaces in a landscape provide ideal opportunities for such experiences.

It is essential that the processes of design, decision-making, and construction, and the schedule, be clear to participating students, since the timeframe for physical change can be too long relative to students' participation in earlier phases. Without understanding a project's scope and when it will be completed, students may become disenfranchised with the entire effort, feeling that their contributions were not valued, and doubtful that change is possible. One method to overcome this is to construct a prototype element with student involvement, such that the future changes have some tangible, immediate representation. Additionally, students should be informed of project updates, to be aware of its progression. Updates could be creatively represented through graphics or other means, and be integrated with curricula.

4.2.2 Design and learning values

As active users of school grounds, students' involvement can not only identify relevant, meaningful elements and relationships, but also foster a sense of ownership in the site. Educational values also may be realized, as a recent national study of schools using the design process in classroom activities noted:

"At the top of teachers' reasons for making design a critical part of their curriculum and teaching strategies are:

- enhancing flexible thinking skills,
- promoting self-directed learning and assessment,
- developing students' interpersonal and communication skills, and
- cultivating responsible citizens" (Davis, et al 1997).

Hart provides a valuable framework for relating activities to children's developmental stages and issues of cooperative learning (1997). Among the stages, he notes that between ages eight and 11, children tend to be enthusiastic participants and take on group work in a collaborative manner. Adolescents tend to be more inward looking and use group work to test their identity. Hart advocates group continuity to build a sense of group identity, social cooperation and democratic development. Within groups, he notes that mixed ages and skills offer potentials for peer learning and enrichment of skills through demonstration. Hart identifies gender distinctions that could enrich learning, citing that girls' learning styles are more centered on conversation and group consensus, while boys tend towards argument and individual activity.

With activities, the decision-making structure offers learning potentials. Hart identifies a spectrum of possible approaches and values, including delegating to the designer, a direct or representative democracy, and consensus (1997). Through interactions in evaluating alternatives and selecting preferences, students can enrich their analytic and communication skills, as well as gain an authentic sense of civic participation.

4.2.3 Child-friendly design methods

The varied inquiry and expression used in the design process are well-suited to engaging children. Methods such as field study, diagramming, model-building, writing, presenting and discussing ideas can provide rich learning experiences if defined in light of:

- children's developmental abilities;
- the design phase and issues being addressed;
- the roles of designers, teachers and facilitators and children; and
- the time and format in which the methods are envisioned for use, such as workshops, charrettes, or a series of class-based exercises.

While plan drawings may seem appropriate to present information to children or for them to create, Kenneth R. Olwig's research raises shortcomings of this approach for younger children (1990). Olwig notes that graphic abstractions are biased against children's preferences for environmental experiences through other senses. He notes that sight is a more "distanced" mode of perception supporting abstract thought which becomes more dominant in the teen years, while the manipulation of concrete objects is supported by more "primary" senses. Olwig relates children's perceptions of space to their bodily experiences, and points out that children tend to orient themselves to people and activity in a landscape rather than the visual composition. These insights reinforce the need for involving children through sensory rich, hands-on methods in presenting ideas to them and in activities to engage their ideas.

In considering appropriate participatory methods, Hart's Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care (1997) is highly recommended. The following overview of methods is drawn from Hart (1997), Race and Torma (1998), personal experience, other literature,

and case studies (see Section 5). These methods identify graphic and experiential approaches to engage children in analysis, programming and design:

- **Walking tours** led by groups of children to identify and discuss particular issues and opportunities of the school site is an immediate, multi-sensory approach that can greatly enrich site analysis and programming. As guides, children give their perspectives and priorities through what they do in spaces as well as what they describe (figure 20).



figure 20

Student guides describe features and issues in their school's urban forest.

photo by: Dale Lang

- **Participant photography** offers a user-friendly graphic means of conveying issues and ideas. In site analysis, disposable cameras or film can be used by children to document and present key issues and opportunities they perceive.
- **Simulations, or full-size mock ups** of elements can dramatically express spatial impacts and opportunities in an outdoor space. Large sheets of cardboard, chalk on asphalt, or sticks and string can be used to construct simulations with children.
- **Models** can be created by children to three-dimensionally represent desired features, as well as spatial relationships of size and location (figure 21). Hart notes the interactive potentials of a realistic model with movable parts: "By manipulating cardboard templates representing trees, shrubs, seats, basketball courts, and so on, even the most cynical of teenagers have been persuaded to get involved in the planning and design process and to argue their point of view fervently" (1997, p. 170).



figure 21

A group-created model focuses discussion of desired elements, locations, and relationships. Here a group of children are working with a University of Washington student facilitator as part of a design charrette for the Puget Sound Environmental Learning Center.

photo by: author

- **Mixed media** formats can creatively engage multiple intelligences. An example is Binger's "treasure hunt" cards, where participants provide a photo of a potential learning environment and note its context as well as how it may be used for classes.

A similar technique I have used with fourth to sixth grade students is a large format postcard on which students are encouraged to draw an image of a favorite place on the front and write a note to a friend on the back about their experience of the place. Intended as a warm-up exercise in charrettes with small groups of children, we found it worked this way with some children, and others took the entire charrette to represent their ideas in this way. Other formal programs, such as "Green Map" (www.greenmap.org) may reveal varied meanings of a place and surroundings, and be integrated with curriculum as a series of activities.

- **Photographs** are valuable, less abstract representations of possibilities and issues. An "ideas board" of photos can spark children's imaginations as an introduction to brainstorming activities. Children can use photos from magazines or other sources to identify desired qualities or elements.
- **Drawings and collages** can be used by all ages to generate a host of ideas without concern for writing abilities. It is important to talk over and note the contents, relationships and what's most important on the drawing, to avoid misinterpreting children's intents (figure 22). Collages may be done by groups as visual dialogues. University of Washington's Dr. Sharon Sutton initiated a brown paper "graffiti wall" for children, parents, teachers, and community members to write or draw their ideas on varied themes in a workshop coordinated by a graduate design studio. To identify priorities, each participant was given dot stickers to place on ideas they felt were most important. This interactive graphic approach built an immediate awareness of issues and relative interest for both the studio members and school-community participants.



figure 22

A charrette group facilitator records students' comments as they construct a model of desired environmental features during a design charrette for the Puget Sound Environmental Learning Center.

photo by: author

- **Interviews and surveys** can be developed and undertaken by children and may involve different groups of school and surrounding community members. These can offer varied perspectives for programming and design. Tabulating and representing results can serve multiple educational goals, while also making the findings accessible to a larger audience.

Involving children in the construction and care of a site provides invaluable opportunities for learning (see Section 5.2 and 5.3). Children can learn from mentors to develop new insights and skills, acquire a sense of empowerment, and begin to form attachments to and responsibility for the landscape. These experiences can build multiple values for children's academic, personal and social development as well as foster their ecological literacy.

5. CONTEXTS AND CASE STUDIES

By their design, environments such as arboreta, botanical gardens, and parks foster engaging learning experiences. It is imperative that this design approach translate to school landscapes and surroundings, since these contexts are integral to children's daily lives. As such, school landscapes can foster experiences that build ecological literacy, enrich children's well-being, and enhance formal, nonformal, and informal learning. These benefits also extend to members of the surrounding community. This section discusses three school landscape contexts drawing from previous collaborative work (see Johnson and Hurley, 1999), with Seattle case studies:

- *school landscapes: T.T. Minor Elementary School;*
- *local parks: Dearborn Park Elementary School; and*
- *neighborhood and community resources: Meadowbrook Pond.*

The concepts presented in this paper serve as a lens to view each case study by:

- *conditions and the designer's role;*
- *design and development process, with references from Section 4;*
- *design approaches and qualities, with references from Section 3; and*
- *experiential values for school and community, with references from Sections 2 and 3.*

5.1 School Landscapes: T.T. Minor Elementary School, Seattle

The design and development of schools on new sites offer unique opportunities and challenges. Opportunities to save and use mature trees and natural areas can provide enriched outdoor learning environments, yet access to future users for a design participatory process may be limited. The redevelopment of existing school landscapes holds challenges as well, given preconceptions of how the site has functioned for both students and the surrounding community. The ongoing redevelopment of Seattle's T.T. Minor Elementary School has features of both a new and existing school, and offers insights for engaging design processes and qualities that includes multiple constituents.

5.1.1 Conditions and designer's role

T.T. Minor is located in Seattle's Central Area neighborhood (figure 23), and is being transformed both inside and outside. In 1995, it was identified for a long-term academic investment by businessman/philanthropist Stuart Sloan. The New School at T.T. Minor Foundation was formed and started planning in 1996, with a vision of attending to every child's personal and academic needs. Featuring a nearly year-round school year and extended day offerings, the new academic program got underway in the fall of 1998 for

prekindergarten and kindergarten students, with a new grade level added with each year as these students advance (H. Miller 2000). This shift within the school brought many challenges, including changes in teaching staff.

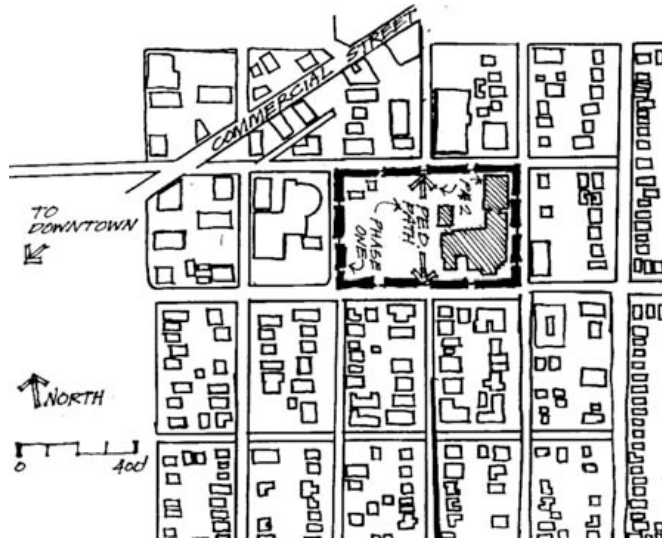


figure 23

T.T. Minor Elementary School is surrounded by a mixed uses, including varied density residential development to the south and east and a major commercial street that leads into downtown Seattle on the north. The site is bisected by a pedestrian path that connects these neighborhood features, and divides the two phased site improvements.

source: City of Seattle Landview CD 1995, drawn by: Anita Madtes and Jose Sama

Amidst the academic transformation, the school's foundation project manager (and former superintendent of Parks) Holly Miller envisioned transforming the 2 1/2 acre site for school and neighborhood use. Within the site, a small playground consisting of two worn play structures was separated from the school by a parking lot. The playground had been leased by the City's Department of Parks and Recreation, and this agency supported improvements. To build community awareness and support, the school approached Barbara Biondo, a neighborhood resident who previously had worked to improve the school's front entry landscape. Biondo involved Denise Harnly, a representative of Seattle's East Precinct Crime Prevention Unit. While undertaking community outreach, they worked with the City's Department of Parks and Recreation to obtain grants from state, county and city programs, as well as a private foundation (Biondo 2000, Harnly 2000, Bullard 2000). An example of community commitment is seen with City's Neighborhood Matching Grant, which brought \$100,000 to match the \$100,000 value of neighborhood-based volunteer time and donations.

A neighborhood/school committee was organized, and received a City grant to develop a conceptual schoolgrounds masterplan. Through a competitive process, the committee selected Allworth Nussbaum in 1998. The completed masterplan was identified in two phases. The City's Department of Parks and Recreation made arrangements to lease play areas identified in the first phase, and hired Allworth Nussbaum to develop detailed design documents for construction. Phase two includes gardens and play areas on school property that is not formally shared by Parks and Recreation. With funding from Seattle's Grey to Green program and private contributions (see Section 2.4), Allworth Nussbaum was hired to design the phase two gardens.

5.1.2 Design and development process

Allworth Nussbaum developed the masterplan through a participatory process that sought to engage neighbors, school parents, children, teachers, school administrators, maintenance staff, and public agencies. Three design meetings were held with adults, and design workshops were held with students in each grade. This level of participation exceeded the design team's scope, but they believed that this broad-based involvement and support was essential for the project to succeed (Allworth 2000). Participatory techniques used in both adult and student forums provide insights.

- **school/community participation**

The design meetings for school and neighborhood participants focused on: 1) programming potentials, 2) creation of design alternatives, and 3) review of a preferred alternative. The neighborhood/school committee encouraged participation at the meetings, and found the best turnout occurred when a meeting was preceded by a student choir concert. At the programming meeting, ideas boards were used to open up dialogue of what was possible. Groups of 8-10 people worked with design staff to generate ideas and identify physical and visual connections to the neighborhood. Each group then presented their ideas to the others. The design alternatives meeting explored locational issues and aesthetic character. The preferred alternative meeting culminated the process, and visually recapped the previous meetings' discussions and outcomes. Following reviews, the masterplan was accepted, and Allworth Nussbaum developed detailed design for phase one in accordance with the masterplan.

In designing the phase two learning gardens, Allworth Nussbaum conducted a design charrette involving community members, artists, a master gardener, parents, teachers and school district staff who work with school gardens. The participants formed two groups to brainstorm and share ideas. These ideas were integrated into the gardens' detailed design.

- **pedagogy**

Although teachers and the principal were involved in the masterplanning meetings, participating teachers did not remain at the school after the new academic program was implemented (Adams 2000). This program promotes hands-on learning experiences, and current teachers may well draw upon the abundant opportunities for learning in the school's landscape. This integration of curriculum with design is happening with the second phase design of the children's learning gardens. Teachers participated in the design charrette, and are undertaking training in the fall of 2000 to apply NSF curriculum in using the gardens for each grade's curricular theme.

- **children's participation**

The masterplanning process included design workshops with children in each grade. These 90 minute interactive sessions, where children brainstormed on their most imaginative, fun places to play, also informed the design (Allworth 2000). To spark children's imagination, each workshop started with a series of ideas boards of creative play, plants, and other images. The design team provided a myriad of building materials, which children used to build models of fun play places. Children worked

collaboratively, with younger children in pairs and older children in small groups. To understand their intentions, the design team interviewed children as they built the models. The models were displayed at a community design meeting. The resulting masterplan was reviewed by students and community members at a celebratory event. The masterplan was not presented in an interactive manner, thus the children's participation in the process seems to fit the "consulted and informed" rung on Hart's ladder of children's participation.

- **development status**

Funds for construction of phase one became available in July 1999, and construction continued through the spring of 2000. The work has been realized through extensive volunteer effort, coordination across agencies, and multiple grants. In 2000, funding for the design and construction phase two learning gardens was acquired through Seattle's Grey to Green Program (see Section 2.4) and private support. This fall, a volunteer work day initiated the gardens' construction, and an entry sign featuring children's tiles was unveiled. In spring 2001, a UW architecture department design build studio led by Professor Steve Bedaines plans to develop garden structures with seating and a double dutch court. The school's foundation continues to seek support for public art that would be created with the students and placed throughout the grounds (H. Miller 2000).

5.1.3 Design approaches and qualities

While the masterplan for T.T. Minor reflects community and school interests in active recreation, it also integrates the design qualities and themes that support learning described in Section 3 (figure 24). Both habitat and gardens define varied spaces, and art features will enliven paving and site structures. A guiding concern throughout the project's design was crime, which was addressed by activating the site with multiple uses and visibility.

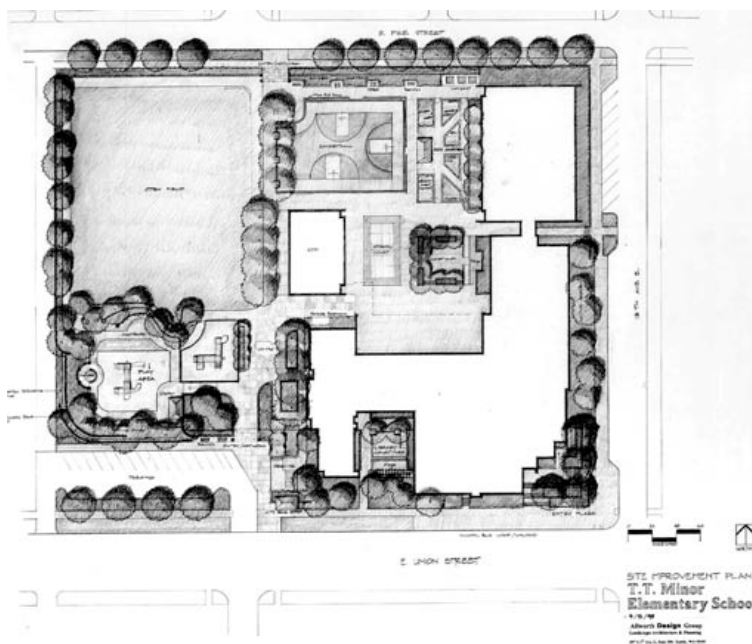


figure 24

T.T. Minor Elementary School masterplan's phase 1 provides an open play field surrounded by a running track with play structures to the south. Native plantings screen the play structures from parking. Phase 2 includes ball courts and learning gardens.

design and image by: Allworth Nussbaum Landscape Architecture and Planning

Referencing qualities noted in Section 3, the masterplan incorporates:

- **natural and cultural systems**

Despite the predominance of the play field and play structures, natural systems are found in native planting areas and the planned learning gardens. The native planting areas extend into the play area with the placement of logs and rocks (figure 25). The planned garden plots will enable students to care for plants and observe changes over time. Cultural features may include public art installations, and choices of garden plot themes.



figure 25

Logs and rocks are found in the native planting area.

photo by: author

- **connections**

The masterplan provides connections at many scales through views, paths and places. Classrooms that face the phase two landscape will have foreground views of the children's gardens. This contrasts sharply with current views through chain link fencing to a paved parking area (figure 26). A grade change at the south end of the site had limited views into the school grounds from the adjacent street. A series of low walls and vegetated slopes, now extend views into the site's play structure area. A new overlook seating area offers a view of the neighborhood and downtown. The site's promenade functions as a visual and physical link within and beyond the site. While linking the varied site features, the promenade also enables pedestrians to cross the site easily (figure 27).



figure 26

The children's gardens are being built in front of this wing, where asphalt has dominated.

photo by: author



figure 27

The promenade, with trees set in raised planters, serves as a central spine through the site.

photo by: author

- **legible and complex image**

The masterplan, and constructed first phase, offer a legible image, resulting from the central promenade and prominent entries and the visually connected play facilities and gardens. Complexity is likely to be realized over time as the plantings mature, to screen and spatially define areas. Seasonal changes in habitat and garden areas will offer intricacy, and the inclusion of art installations may bring new layers of meaning to the landscape.

- **varied scales**

The masterplan's geometry relates primarily to the building and block patterns, but alternatives in paths and places also are created. The promenade serves as a central spine, with paths leading off it to an amphitheatre-like seating area, building entries, and the planned gardens. The vast open play field is contrasted in scale by the smaller structure play areas, and peripheral seating areas (figure 28). Landforms define the amphitheatre seating area, as well as a planned sunken court for double dutch jump rope, a popular school activity. Individual, child-sized spaces are less apparent. Over time, the plants, boulders and logs in the habitat area may create child-sized refuges.



figure 28

A small amphitheater overlooking the play structure is set in the slope below the play field.

photo by: author

- **flexibility**

Although active recreational facilities occupy much of the site, the central promenade and its entries provide opportunities as flexible, open-ended spaces that can be used in varied ways, with activities extending into the paved play courts or grass field. Loose parts, or elements that can be changed and re-created, are limited, although the future children's gardens could support such experiences.

- **aesthetic quality**

The masterplan and first phase of construction promote an aesthetic that responds to the urban context and recreational priorities while creating unique expressions of place. The habitat area along the colorful play structures contains boulders and logs of the region. The sunken double dutch courtyard is planned with inscriptions of songs used in the game, and other art installations will be developed with children's participation. The learning gardens will provide children opportunities to create ever-changing compositions.

5.1.4 Experiential values for school and community

The masterplanning process and design for T.T. Minor highlights the school landscape's potentials for shared school and community use. The site traditionally had been heavily used by neighborhood residents for weekend basketball and recreation, and as a pedestrian connection between residences and local shops. These uses are enhanced with attention to concerns about crime, as well as the community's need for a focal point (Biondo 2000). As a learning environment, there are numerous opportunities for the site to serve as a stage and as a medium for curriculum and play. The project's second phase holds unique learning opportunities. Children's participation in the design process may be integrated with curricula while informing the design. The phase two learning gardens could be developed with volunteer mentors from the community. This landscape may well provide school children and community members with key learning experiences described in Section 3:

- **sensation**

While the play field, courts, and structures offer a myriad of physical challenges, other senses may be engaged by the habitat and gardens. For example, edible, fragrant, and textured plants provide settings where one can taste, touch, smell and listen.

- **choices**

The masterplan provides opportunities for a variety of activities, social interaction, and movement. Of particular note is the play structure area's perimeter, with choices in being a part of the play activity, watching from a bench or the amphitheatre, or being separate at the overlook or steps along the west edge.

- **manipulation**

Although art installations may provide children with opportunities to effect change in the environment, the learning gardens hold tremendous opportunities for on-going manipulation. The play structures of phase one provide interactive, movable parts, yet for children seeking open-ended manipulation, the play area's bark chips may become material for the imagination.

- **sense of place**

The masterplan's participatory planning process has resulted in community and school constituents who supported its features by actively contributing to its creation. Over time, the settings will take on added meaning with continued use, community events, and formal learning programs.

5.2 Local Parks: Dearborn Park Elementary School, Seattle

Many existing schools lack space for diverse habitats or community activities. Yet adjacent or nearby parks may become an integral part of a school's learning environment. Partnerships with local parks departments, other open space agencies, and non-profit

organizations can benefit school children, neighbors, and the local ecosystem. Such creative connections have enriched Dearborn Park Elementary School and its adjacent urban forest and park in central Seattle (see also Johnson and Summers, 1998 and Johnson and Lang, 1997).

5.2.1 Conditions and designer's role

The forested landscape around Dearborn Park Elementary contrasts sharply with the surrounding grid of residential and commercial development (figure 29), and this unique setting has become a focus for hands-on, integrated studies for all students. Interest in outdoor learning interests got underway in 1994, when the school created an International Garden. Concurrently, the Seattle Department of Parks and Recreation was seeking assistance from the Trust for Public Land (TPL) to secure an adjacent, privately owned wooded ravine as community open space. TPL had initiated a national "Green Cities Initiative" to secure land within cities for parks and open space, and empower neighborhood groups in the process. TPL staff recognized the opportunity to expand the forest's role as a learning environment for the school, and the idea was welcomed by the school's principal and teachers.

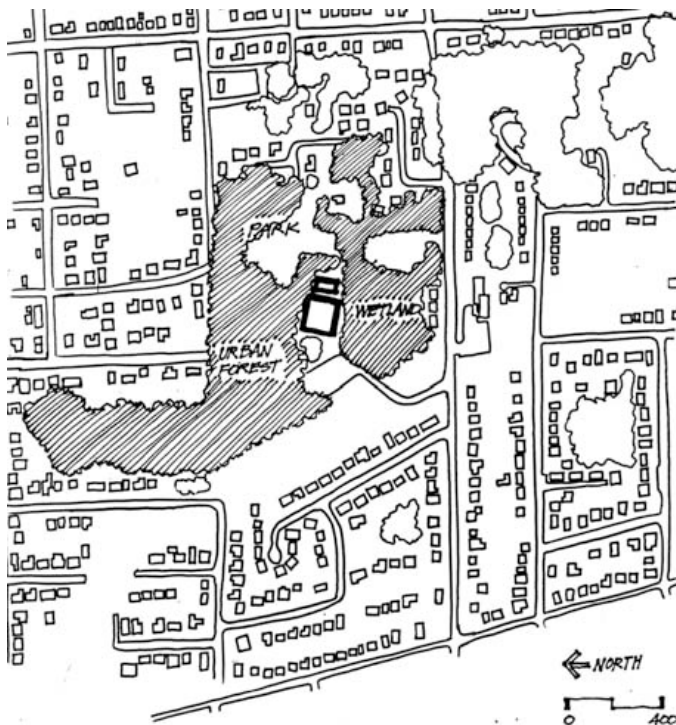


figure 29

Dearborn Park Elementary School is sited in an enclave of parkland, forest and wetland amidst an urban neighborhood.

source: City of Seattle Landview CD 1995, drawn by: Anita Madtes and Jose Sama

The former principal envisioned creating a model educational program, and various organization representatives and school leaders came together to tailor a curriculum that was integrated through hands-on environmental studies of the forest. The Washington Forest Protection Association provided curriculum and teacher training.

As this environment-based curriculum was implemented under the leadership of a new principal, forest clean-up and improvement efforts got underway. On Earth Day 1996, teachers, students, TPL staff, Parks and Recreation staff, and other volunteers removed invasive plants and debris from the forest. Clean-up efforts continued, with each class taking on a portion of the site. A path that once connected the school with the neighborhood was re-established and a bridge was built to cross the ravine.

In addition to the forest, a wetland on the school site and the adjacent Dearborn Park were identified as valuable educational resources. In 1997, Allworth Nussbaum was hired with funds from the Trust for Public Land to develop a comprehensive master-plan. The client was a project committee including representatives from TPL, the School District, the Department of Parks and Recreation, as well as the principal and teachers. Design work for the school's wetland has proceeded with support from a local foundation, and construction is supported with funds from Seattle's Grey to Green Program.

5.2.2 Design and development process

Dearborn Park Elementary's masterplanning process was initiated through the school, with potentials for children's learning as a primary objective. Allworth Nussbaum's participatory process was inclusive, engaging neighbors, school parents, children, teachers, school administrators, maintenance staff, and other agencies.

- **school/community participation**

As with T.T. Minor's masterplan process, three design meetings were held with school and community constituents to address programming potentials, creation of design alternatives, and review of a preferred alternative.

- **pedagogy**

Dearborn's principal and teachers were committed to enriching the students' learning experiences, and had used the urban forest through an integrated curriculum. They viewed students' involvement in the design process as part of curriculum, and worked with the design team on site analysis and programming projects (Allworth 2000).

- **children's participation**

The design team developed materials describing site analysis and programming for activities the teachers used with their curriculum. Academic skills and problem solving techniques were applied, as student groups undertook site analysis and programming exercises in the landscape. Like the process used at TT Minor, each grade took part in a design workshop, and built models to express their ideas (figure 30). Design team members talked with the students about their intentions and goals. Rendered drawings of the masterplan were later posted at the school for classes to review.



figure 30

Dearborn Park Elementary School students used a collage of materials to explore their design ideas in workshops led by the design team.

photo by: Allworth Nussbaum Landscape Architecture and Planning

As with T.T. Minor, Dearborn children's participation in the design process seems to fit Hart's ladder rung of "consulted and informed," although here they played a more significant role as consultants. Findings from their site analysis and programming activities provided valuable insights to the design team. These activities also provided a self-defined basis for the design ideas students developed in the workshops. This broader exposure gave students an opportunity to experience the design process as a method they can use in other contexts.

Beyond participation in the design process, children continue to take an active role in developing and sustaining habitat and gardens as part of their formal studies and nonformal learning. During initial forest clean-ups, naturalists from the Department of Parks and Recreation helped students identify invasive species and remove them. Today, each class is responsible for caring for part of the landscape (Lassiter 2000). Children in kindergarten, first, and second grades care for the native plant garden and international vegetable garden, pulling weeds and composting. Fourth grade students planted native plant and butterfly gardens, and tend the latter with third graders. Fifth grade students continue to remove invasive species from the urban forest and maintain the trail. In 1998, a class of fifth graders prepared a successful grant application for equipment and supplies to maintain the forest. Additionally, these students can earn a "forest guide" certificate and become mentors for younger students.

- **development status**

The masterplan for the school and surroundings is complete, and the wetland's outdoor classroom has been designed and awarded funding through Seattle's Grey to Green Program (see Section 2.4). Portions of the masterplan have been implemented, including the native plant and butterfly gardens and a ceremonial forest gateway (figure 31). Adorned with bronze leaves and vines, the gateway was created through a creative collaboration: Dearborn students made clay leaves which a high school art class referenced to make enlarged bronze castings, and students from a community college incorporated the leaves and vines with the gateway. The principal hopes to develop interpretive signage throughout the forest and gardens for students and

community members (Fairchild 2000). Maintenance of the school and park land is coordinated through monthly meetings attended by representatives from both agencies and a representative of the Washington Forest Protection Association (Fairchild 2000).



figure 31

The new forest gateway features bronze leaves and vines created through a partnership of schools and student creativity.

photo by: Allworth Nussbaum Landscape Architecture and Planning

5.2.3 Design approaches and qualities

Dearborn Park Elementary's masterplan draws upon and enriches existing habitat and creates culturally expressive gardens and features (figure 32). The site is an oasis in an urban neighborhood, offering unique opportunities for students and the community to have daily contact with nature as well as build understandings of its cultural meanings and values.

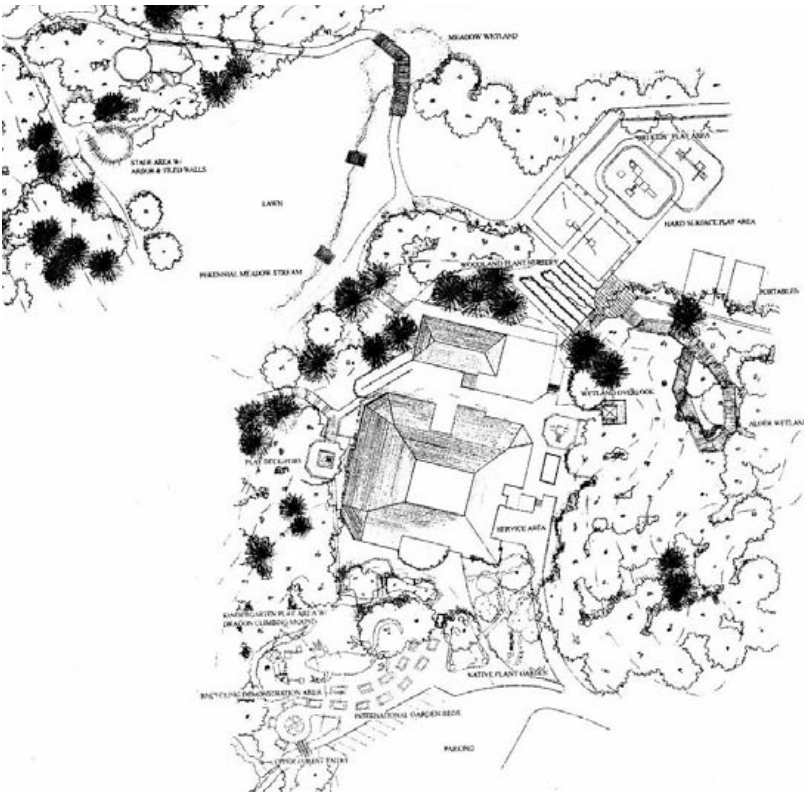


figure 32

Dearborn Park Elementary School's masterplan features an arc of plots for the international garden along parking, as well as the upper forest entry and native plant garden. Wetlands are located to the right and above the school, and the lawn (upper left) features a stage area.

design and image by:
Allworth Nussbaum
Landscape Architecture
and Planning

All landscape qualities discussed in Section 3 are evident:

- **natural and cultural systems**

Existing natural systems have become a focus for hands-on learning and stewardship, and cultures are celebrated through vegetation and artifacts. The ravine, forest, wetland and gardens are varied settings for manipulation and discovery. The international garden provides unique opportunities for children to learn about the foods and cultures of the diverse student body. Other site features relate cultural and artistic understandings, such as the forest gateway and another planned for the wetland entry.

- **connections**

There are strong connections within and beyond the school site afford at local and regional scales, however the immediate visual connections from inside the school to the landscape are missing. Classrooms have window openings above eye level, but have doors to the outside. However, there is limited and poorly defined transitional space for class gatherings immediately outside the classrooms (figure 33). Within the landscape, views and paths lead from open areas in front of the school that feature gardens and a sloping lawn to the densely vegetated forest, ravine, and wetland. The ceremonial gateway to the forest acts as a prominent marker for the trail system that winds through and connects with the neighborhood. The intermittent stream in the ravine, provides the actual and conceptual connections that educator David Sobel recommended for middle childhood, where the immediate landscape experience links to larger scales. During a forest tour, a 5th grader noted that this stream connects with Lake Washington and so pollution in this ravine will eventually impact the lake.



figure 33

There is limited transitional space near the building for class gatherings.

photo by: Anita Madtes

- **legible and complex image**

The school landscape and dense forest contrast sharply with the image of the surrounding neighborhood, and offer rich opportunities for exploration. Legibility is provided by pathways connecting various parts of the site with the centrally located school building, and reinforced by landmarks such as the gateway, bridge across the ravine, and planned artwork. The complexity of the varied landform and vegetation also supports personalized images of place through experience. For instance, on a forest tour, a student guide stopped along the trail to point out a fern off to one side.

He described finding this fern, but being unable to identify it. He took a frond into the library and looked it up, and discovered that this was not a common fern. This experience marked a memorable location along the trail for him.

- **varied scales**

The school's gardens, grassy slopes, play areas, and forest offer diverse scales in paths and places. The adjacent park's open lawn accommodates field sports, and play structures are nearby. Grass slopes adjacent to the kindergarten classrooms at the front of the school are used to the point where erosion is a problem. This "front yard" faces the school's drop-off and loading area and becomes a social gathering space. Raised planters and gardens create numerous edges and sub-areas for groups to gather. The forest edges to lawn offer child-sized spaces for prospect and refuge. Within the forest, a trail system traverses a variety of spaces as it winds down the slope and along the ravine to the field below. Logs in a forest clearing provide an informal gathering area (figure 34).

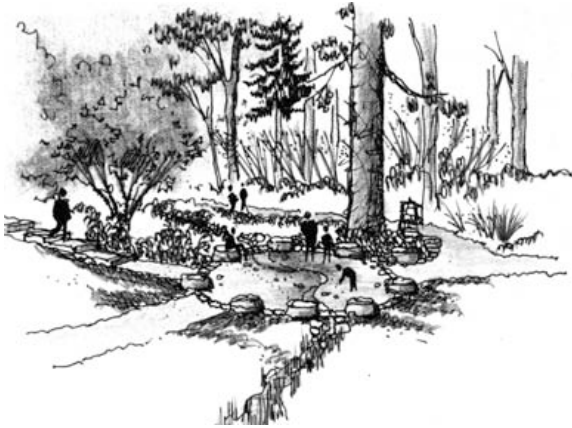


figure 34

The forest's lower entry can function as a gathering space.

*design and image by: Allworth Nussbaum
Landscape Architecture and Planning*

- **flexibility**

The landscape's size and diversity ensures flexibility in space and loose parts for children's explorations and formal learning activities. The site's natural features inherently provide these opportunities, and built elements support them as well. A terrace in the park may function as a classroom or stage for inspired play. The school's front yard can accommodate large and small groups of people, and its vegetable and native plant gardens display seasonal changes for an ever-evolving character.

- **aesthetic quality**

While this forested landscape is a unique environment for a central Seattle school, the planned interpretive spaces and features will add another layer of meaning. These features are envisioned to complement the diverse habitats as well as relate to their cultural context. For example, the school's front gardens are for vegetables of school families' homelands, butterfly attraction, and interpretative native plant exhibits.

5.2.4 Experiential values for school and community

Dearborn Park Elementary's landscape illustrates how an urban green space can provide valuable habitat, recreation, and learning potentials by partnering school, park, and community resources. The school's joint use agreement with the city allows students to use the forest and park playground (Lassiter 2000). Although the forest is (and wetland will be) available to students only during supervised class sessions, these areas are used regularly. The urban forest has been transformed as an accessible amenity for the surrounding neighborhood. The school landscape builds a sense of community among the school's families. The international vegetable garden is tended by student and family volunteers in the summer, and a harvest festival brings together school and neighboring families. This festival includes the foods of school families homelands, creating opportunities to build ties to the school and each other (Lassiter 2000). This unique environment supports key learning experiences for school children, their families, and other neighbors:

- **sensation**

The forest and wetland habitat offer sensory experiences unique in this neighborhood, including the sounds of water and birds, filtered light through forest canopy, and fragrances of damp earth and vegetation. Paths offer sequentially revealed views and wind around obstacles, calling attention to details above and below. The gardens provide opportunities to feel and taste plants as windows into other cultures. Play fields and play structures offer physical challenges.

- **choices**

As noted in "varied scales" above, a spectrum of choices are available for activities, sociability, and movement. Spaces for small groups or individuals are found in the forest, fields and gardens, and along the edges created by forest and built structures. Bare-soil paths along the forest edge attest to frequent use (Madtes 2000).

- **manipulation**

The gardens and forest provide rich and empowering experiences for children to manipulate objects and create environments. With classes regularly caring for portions of the landscape, the children experience firsthand how their interventions influence change over time.

- **sense of place**

A strong foundation for building a sense of place and stewardship among students is established by the comfortable settings, diversity of manipulable and habitable spaces, and formal curriculum that focuses site experiences. Opportunities for personal attachments to place are fostered through mentoring by older students and caring for a part of the site throughout each year. And the school's annual harvest festival with international foods is creating a tradition families coming together in this landscape as a community.

5.3 Neighborhood and Community Resources: Meadowbrook Pond, Seattle

Nearby neighborhoods and community resources may serve as integral school learning environments in addition to local parks. Resources include public parks, community centers, utilities, and other civic institutions. When such places are conceived or recognized as learning environments, students and the larger community may be engaged in the landscape's development and on-going stewardship.

In northeast Seattle, the Thornton Creek watershed hosts multiple places and organizations for learning and ecological stewardship, including the Thornton Creek Alliance, a "grassroots, nonprofit organization dedicated to preserving and restoring an ecological balance in the Thornton Creek watershed" (TCA website). Another initiative is the Thornton Creek Project, a collaboration of schools and others to study and care for the watershed. Extensive hands-on curricula have been used at some 25 schools in the watershed, ranging from elementary level to community college (TCP website).

A special place along Thornton Creek also fosters learning for all ages, although not specifically designed with this intent. When Seattle Public Utilities (SPU) undertook the development of a flood control and sedimentation pond project, an extensive public process and artists' vision expanded the potential roles and character of this site. The result is an ecologically, artistically, and educationally rich neighborhood open space called Meadowbrook Pond.

5.3.1 Conditions and designers' role

Today the nine-acre site of Meadowbrook Pond appears more like a sculpted garden than a public utility, with whimsical features animating the naturalized setting of landforms, pond, and Thornton Creek. The site is nestled in a low density residential neighborhood, with three public schools and a community center nearby (figure 35). Yet in 1989, the site and its context were quite different when the City's capital improvements budget included funds for a flood control project. The site's contained a defunct sewage treatment plant that had been an attractive nuisance, and the local community requested its immediate removal.

In 1990, the plant was demolished, and planning for a flood control pond commenced. SPU project manager Pamela Miller began a series of community meetings to address concerns and potentials for the site's development. Neighbors valued the open space and enjoyed the wildlife that frequented the site. Nathan Hale High School used outbuildings on the site for shop classes and a horticulture program. Miller organized a Citizens' Advisory Committee of diverse interests to examine precedents and help define the project's scope. The community reached consensus that the pond be designed as an amenity and wildlife habitat. SPU engineers designing the project involved consultants such as a fisheries ecologist, wetland ecologist, and modeler of flood conditions. By late 1995, plans were submitted to the state for approvals, but due to agency cuts plan review was scheduled to take a year (Miller 2000).

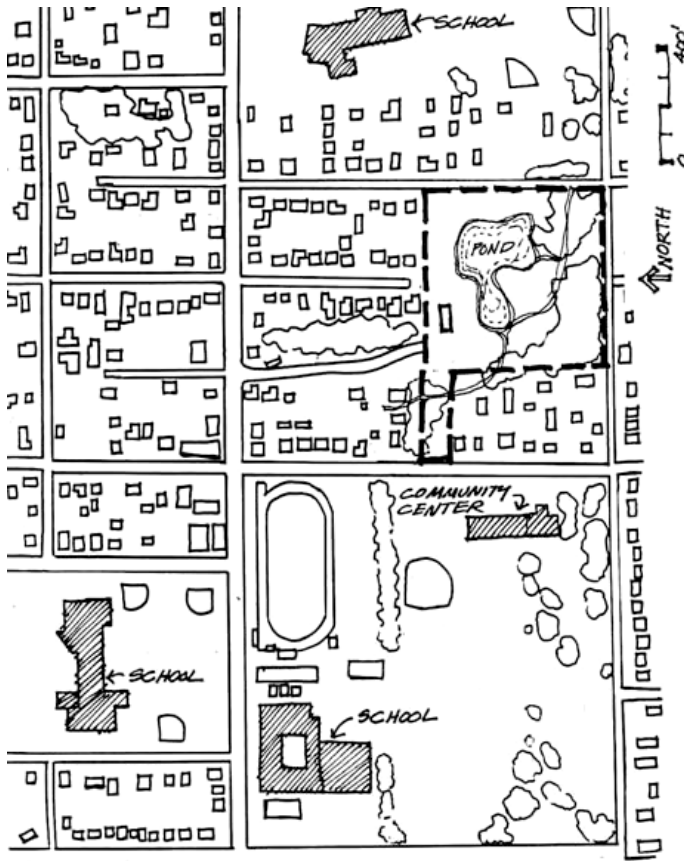


figure 35

Meadowbrook Pond, outlined with a dashed line, is set in a residential neighborhood with three public schools and a community center nearby.

source: City of Seattle Landview CD 1995, drawn by: Anita Madtes and Jose Sama

The community was eager for change, and Miller sought to sustain interest by initiating the project's public art component through Seattle's Percent for Art program. The Seattle Arts Commission administers this program, and placed a national call for artists. Three teams were shortlisted to present proposals. The selected Seattle-based team distinguished itself by integrating the site and its inherent qualities with art. This multi-disciplinary artist team was architect/artist Lydia Aldredge, landscape architect/artist Peggy Gaynor, and artist Kate Wade.

5.3.2 Design and development process

The site's design met the intent as a flood control and sedimentation pond, met community goals for open space, and came to life through the artist team's vision. In this team's vision of aesthetic and experiential qualities, they creatively drew upon the site's development to enhance the sense of place. The artists recycled the soil from the pond excavation as a series of sculptural earthworks, and in the process the estimated \$250,000 cost of soil removal was redirected to implement site artworks (Gaynor, Miller 2000).

- **school/community participation**

Although community involvement originated with concerns relating to the unused sewage treatment facility, the pond's planning process served as a catalyst for organized community participation. The artist team's design intentions were

presented at community meetings and moved forward. As the pond was developed, community members were enlisted to help with site features and be stewards of the completed site. Landscape architect Peggy Gaynor had worked with this community in volunteer planting efforts through her design for nearby Meadowbrook Wetland and its phased development that started in 1993. At Meadowbrook Pond, Gaynor engaged high school students and other volunteers to plant native species and build tufa walls (figure 36). Gaynor has continued to work with SPU and the community, starting "Friends of Meadowbrook Pond" in the fall of 1999. A Friends work party at the site drew over 50 people, including a local boy scout troop. The group's focus also includes fostering learning about the site through docent training and tours and activating the site as a stage for cultural events and community gatherings (Gaynor 2000).



figure 36

Students and other volunteers help landscape architect Peggy Gaynor construct tufa walls at Meadowbrook Pond. artwork © Peggy Gaynor, Lydia Aldredge, Kate Wade, Reflective Refuge at Meadowbrook Pond, 1998.

Photo: Peggy Gaynor

- **pedagogy**

Throughout the pond's planning and development, SPU's Pamela Miller sought to integrate learning potentials. Miller received a \$200,000 grant from the Washington Department of Ecology to develop a high school oriented wetland curriculum. She organized scientific and educational technical advisory committees that included local teachers to develop the curriculum. During the project's construction, classes from John Rogers Elementary School visited the site to learn about its design and goals. The students collaborated with an artist to develop an interpretive display of this project and the values of wetlands. Nathan Hale High School's horticulture program remained on the site, and a new greenhouse was constructed as part of the project to support this program. Summit K12 School uses the site for classes, and teachers have invited Peggy Gaynor in for presentations.

- **children's participation**

While children did not participate in the design process in ways relating to Hart's ladder, they have played an active role in the pond's development and care. Children have observed site construction, undertaken volunteer plantings and tufa wall construction with Gaynor, and studied the site's environmental qualities. High school horticulture students served as docents during the project's grand opening in June 1998, explaining the site features to visitors. A planned partnership with the school to grow wetland plants for the site will provide opportunities for continued care, and Miller hopes to foster a student docent program.

- **development status**

With construction completed in 1998, Miller has continued to pursue opportunities to use the site as a learning environment for schoolchildren and citizens. Portico, an interdisciplinary design firm, was hired to design an environmental learning center for an adjacent site. The center would present the watershed and its human and habitat relationships through hands on learning experiences. The center's innovative design includes exhibits, demonstration gardens, and two buildings. To date, budget constraints have halted its development.

5.3.3 Design approaches and qualities

Meadowbrook Pond's meaning and values are multifold, and are revealed in its design. Its origins as a flood control and sedimentation pond have been enriched by desires for a meaningful habitat, neighborhood amenity and learning environment. The artists incorporated these potentials while envisioning the site as an inspiring and quiet refuge from the city. Titled "Reflective Refuge at Meadowbrook Pond" the site's earth-sculpted spaces and artistic features call attention to natural elements and events (figure 37). A Sound Mirror directs sounds of water falling over a dam to a Sound Reflector Wall. A flood pool and a Water Gate pavilion that literally steps down into the pond provides opportunities for people to touch the water. Playful mosaics set in the paving and inscribed metal panels provide imagery and text of the meaning of this place. Native plants along the slopes, in wetland areas, and along the pond provide regional insights.



figure 37

The winding paths along berms in the upper right of this photo lead left to the Sound Reflector Wall and tufa wall, flood pool and Water Gate pavilion. A footbridge spans the pond to connect with the eastern neighborhood. artwork © Peggy Gaynor, Lydia Aldredge, Kate Wade, Reflective Refuge at Meadowbrook Pond, 1998.

photo by: Seattle Public Utilities

The artistic spatial and ecological diversity demonstrate these landscape qualities:

- **natural and cultural systems**

The site's wetland habitat supports wildlife including herons, eagle, salmon, river otter and even a beaver family. Views and sounds within the site are predominantly of nature, since mature trees that were preserved along the site's edges screen surroundings, and the landforms buffer street sounds. The site's diverse artworks provide insights of and access to the natural surroundings. For example, artwork and text inscriptions offer poetic understandings, the Sound Mirror provides sounds of rushing water that is not visible from the Sound Reflector Wall area, and an

artistically expressed footbridge crosses Thornton Creek for access from the site's west side.

- **connections**

Visual and pedestrian access into the site are clear and frequent along the site's residential edges. An extensive bridge spans the pond to connects the eastern neighborhood (figure 37). The west entry offers a distinctive separation between the site and adjacent busy street. The entry is well-marked, but upon entering, landforms flank a winding path block street noise and views. Progression into the site brings nature to one's senses (figure 38). Miller notes that safety was a community concern, thus every part of the site is designed to be visible from other locations.



figure 38

A utilitarian sign as well as tall earth berms flanked by boulders and walls with inscriptions mark the pond's west entry. The path winds around the berms that cut off sights and sounds of the street. artwork © Peggy Gaynor, Lydia Aldredge, Kate Wade, Reflective Refuge at Meadowbrook Pond, 1998.

photo by: author

- **legible and complex image**

The site's image is both legible and complex. Its unique landforms, bridges, structures and tufa wall are memorable landmarks. However, the sequential revealing of views and spaces creates a sense of mystery as one moves through the site, and these varied views enrich understandings of the site. Details within built elements and ever-changing vegetation and water all provide complexity for continuous discovery.

- **varied scales**

A rich diversity of scales are found, including intimate spaces among sculpted landforms, the refuge of the tufa wall, and the broad island-laden pond crossed by a bridge. The undulating topography and structures offer spaces that can support large groups as well as places for solitude. Alternative paths climb slopes and provide distant views, or prospect, while others connect to the creek, pond, and surrounding neighborhood (figure 39).



figure 39

Boulders mark the intersection of a path to an overlook above the tufa wall with a path that winds along Thornton Creek. artwork © Peggy Gaynor, Lydia Aldredge, Kate Wade, Reflective Refuge at Meadowbrook Pond, 1998.

photo by: author

- **flexibility**

The site offers conditions and materials that foster flexibility in its character and use over time. Varying water levels create challenges for wetland species, which makes planting areas a source of experimentation. The arrival of beaver to the site has resulted in a management strategy that seeks to balance habitat and flood control values of the site. The site's diverse spaces are flexible in how they may be used and in accommodated large and small groups. While the site provides places for solitude, it also can be a stage for community events.

- **aesthetic quality**

Meadowbrook Pond's blending of natural systems and artistic expressions creates an engaging aesthetic. In a Seattle Arts Commission Publication, the artists are quoted describing the project: "An earthwork integrating structure, earth and pond as sculpture, it is effected and transformed by light, seasons and weather, creating ever-changing moods, textures and colors. Removed from the urban setting this landform shelter serves to focus and connect one physically and emotionally with nature" (1998).

5.3.4 Experiential values for school and community

While not designed explicitly for learning, Meadowbrook Pond holds tremendous potential as a learning environment for area schools and community members. The participatory planning and construction processes invested many in the project. Numerous schools use the site for environmental studies, and the adjacent high school's horticulture program uses the on-site greenhouse. Neighborhood and community residents visit the site, exploring the varied paths and features, and observing wildlife. The site's qualities engage multiple intelligences through varied experiences:

- **sensation**

The site's rushing and still water, tufa walls, Sound Mirror, mosaics, structures, landforms and diverse vegetation offer myriad sensory experiences (figure 40). Paths that wind up and around slopes provide kinesthetic challenges and opportunities for new perspectives. With the landform buffering street noise, the sounds of water, wind, and wildlife can be heard. Details found in the hand-formed tufa walls, inscriptions, and mosaics create opportunities for tactile discovery.



figure 40

The overlook above the tufa wall and Sound Reflector Wall provides views of the flood pool and Water Gate pavilion, pond, and Sound Mirror disc at the far right. artwork © Peggy Gaynor, Lydia Aldredge, Kate Wade, Reflective Refuge at Meadowbrook Pond, 1998.

photo by: author

- **choices**

The site's variety of spaces and paths offer choices for different forms of sociability and movement. Unlike formal play areas, the site does not prescribe particular activities. As paths diverge, choices in where one explores, pauses, and rests are determined by the visitor.

- **manipulation**

Experiences in manipulation abound through natural materials. The site's wetland vegetation serves as a key component for study and experimentation. "Loose parts," such as pebbles in the tufa wall area and the water itself, provide basic elements for creative play and experimentation. The proposed environmental learning center will contain demonstration plots and interactive exhibits that will further enrich formal learning potentials.

- **sense of place**

Meadowbrook Pond provides numerous comfortable settings to pause and rest, and has successfully invited use by its neighboring community as well as schoolchildren. Pamela Miller notes that Meadowbrook Pond has become a focus for the community, and they have taken a sense of ownership in the site. The site is well-used during the day by people of all ages, for walks, jogging, bicycling, exploration, study, and play. Despite informal community policing, the site continues to experience some vandalism. The site's location and accessibility historically attracted teens for parties, and this activity has continued. Miller notes that high school students' participation in plantings and the tufa walls helped foster their sense of stewardship in reporting vandalism (Miller 2000). The scheduling of community events by the "Friends" group and interpretive activities also provides more of a community presence. As the landscape matures, its unique artwork and diverse wildlife (particularly the resident beavers and their constructs) draw people to visit this place of refuge within the city.

6. A FUTURE FOR ENRICHING SCHOOL LANDSCAPES

This document has presented the learning values of school landscapes to give a context for design qualities, themes, and processes that may enrich these landscapes for children and community. All children need time and places to develop an ecological literacy, and this is particularly challenging in contemporary urban environments. As significant settings in children's daily lives, school landscapes hold incomparable opportunities for learning through multiple intelligences. School landscapes may actively engage the surrounding community, as local and national initiatives have recast schools as centers for community life. The case studies and examples suggest conditions for creating meaningful school landscapes. Looking to a future where school landscapes are widely valued and enriched as learning environments, four conditions seem essential: institutional support, community partnerships, supportive pedagogy, and informed, innovative planning and design. These four conditions are presented here, noting issues and opportunities.

6.1 Institutional Support

To create widespread and lasting improvements to school landscapes, institutional policies, programs, and funds need to support outdoor learning at all levels of the educational system and within local communities. Funding and support are needed for inclusive participatory design processes to develop school landscapes as integral learning environments for school and community, as well as for constructing and sustaining them as such. Currently the provision of outdoor learning environments isn't widely found on policy and funding agendas through what is funded for site work, design criteria and scope of work, and capital improvements budgets.

To build awareness and advocacy for outdoor learning environments, the many educational and community values of landscapes need to be presented to policy-makers, administrators, teachers, parents, and communities in compelling ways. Effective change can be initiated through:

- **current and continued research on learning values**

Existing research and alternative learning approaches (see Section 2.2) have demonstrated that the environment can engage multiple intelligences, serve as an integrating context for curricula, and foster internalized meaning for students. Enriching landscapes may support such learning more successfully than school classrooms. To respond directly to our national preoccupation on test scores and accountability, further research and dissemination of findings are needed to demonstrate how effectively learning is enriched through contact with enriching environments. The State Education and Environment Roundtable study (see Section 2.2) is a good example of such research and dissemination. The Department of Education's "Educational Facilities Clearinghouse" (see Section 1.3) offers a growing literature on issues related to school landscape design, and more information is

needed on how and why these environments can be central to learning by children and community members.

- **successful models**

At a local level, successful precedents are excellent catalysts for building broader institutional support, as Berkeley's Edible Schoolyard project demonstrates. The transformation of one school's grounds and curriculum around the life cycle of growing food has resulted in district-wide adoption of policies for every new school to have a kitchen and garden. The success and national media coverage of this model should inspire leaders in other communities to undertake similar projects in their schools.

- **outside support**

Like the Edible Schoolyard, many school landscapes are enhanced with funding from foundations. These funds may be specified for particular issues, rather than support for comprehensive planning of school sites and surroundings. The Boston Schoolyard Initiative is an innovative partnering among foundations and with the City to enrich school landscapes, with a planning process that builds on each school's unique context. Initial funds are used for community outreach to ensure that a full spectrum of school and community values are incorporated in site development.

- **system-wide commitment**

Formalized institutional support is essential to move from individual initiatives to systematic enrichment of school landscapes. School districts and state and national agencies need to direct and actively support research, policies, and funding for outdoor learning environments. National programs supporting school outdoor learning environments would benefit from advocacy by professionals, academics, and community members. With thirty states requiring environmental education in their curricula (Holmes 1998), the immediate school landscape becomes a compelling resource. As a living classroom, an enriched landscape relates local experiences with the surrounding region and distant environments.

6.2 Community Partnerships

Community partnerships that transform school landscapes and expand outdoor learning environments beyond the school hold multiple benefits. The three case studies (Section 5) and examples of programs (Section 2) illustrate different ways such partnerships can engage governmental agencies, nonprofit organizations and foundations, and neighbors with school interests. With this layering of partners, a creative synergy of funding, resource allocation, and stewardship can build more meaningful and enduring environments. Partnerships can build from:

- **shared agency resources**

The successful partnerships described in Section 5 demonstrate that shared land ownership and management can become opportunities rather than obstacles. These

partnerships may take many forms. Parks Departments may lease school grounds for community open space, as at TT Minor Elementary. School landscapes may include adjacent parks and urban forests, as Dearborn Park Elementary demonstrates. Land owned and maintained by public utilities or other agencies may support school use and programs, as Meadowbrook Pond has become a destination for local schools.

- **non-profit support**

Nonprofit organizations can provide funds for land and site improvements, as well as professional expertise to enrich learning potentials. For example, naturalists with the Audubon Society in Boston work with schoolchildren to understand their local ecology. Acquisition funding for Dearborn Park Elementary's urban forest was provided by the Trust for Public Land, and the Washington Forest Protection Association provided expertise in tailoring grade-appropriate curricula to the forest. At TT Minor, an organization's annual community enhancement day brought over a hundred volunteers to help build children's raised gardens and plant areas. The nonprofit organization "Intergenerational Innovations" has provided volunteers to work with students as mentors.

- **multiple users' involvement**

Involvement of a broad constituency of users and sustained leadership are vital to the development and ongoing care of school landscapes. Users include school students, teachers, administration and parents as well as neighbors and community groups. Woodridge Elementary (see Section 4.1) illustrates how parents' initiatives resulted in the creation of a riparian habitat with involvement of students and teachers, volunteers, grants and local donations. At TT Minor Elementary, the support of neighborhood and community interests was central to the first phase of development funded by grants from varied sources. The community played an active role with school representatives in the funded masterplanning process and contributed time and materials for a matching grant award.

6.3 Supportive Pedagogy

A pedagogy that supports experiential learning is needed for school landscapes to be successful formal learning contexts as well as support informal play and nonformal learning. Administrative support, developed curriculum, teacher preparation, and sufficient adult supervision of student groups are all needed to reveal school landscapes as what architect/educator Anne Taylor calls three-dimensional textbooks (1993). Additionally, the school and site design processes can and should be integrated with learning. Programs that integrate the design process with curriculum (see Section 4.2) have demonstrated a myriad of learning benefits.

Dearborn Park Elementary demonstrates what can happen when all these factors to create a dynamic and expanding outdoor learning environment:

- The principal has advocated for the educational use of the school's landscape, and continues to seek out grants and community partners to enrich it.
- A curriculum tailored to each grade and the landscape's forest has been developed and implemented.
- Teachers have been trained in using the curriculum, and have expanded upon it.
- Teachers integrated the site masterplanning process in their curricula, applying varied skills to site analysis and programming activities as well as the design workshop.
- To provide adequate supervision for students, classes split up and half use the staffed computer laboratory, while the other half are outdoors with their teacher. Through this formalized approach, the school landscape has become an integral place and media for students' formal learning.

While a growing body of literature on outdoor learning provides curriculum and methods, these tools need to be paired with teacher training and assistance that can be achieved by:

- **grants for training**

The Boston Schoolyard Funders Collaborative (see Section 2) offers a professional development grant program for teams of teachers. The grants require participating teachers to share their experiences with others at their school. At Berkeley's Edible Schoolyard (see Section 2), grants enabled teachers to develop curriculum and mentor other teachers in making the garden integral with curriculum.

- **institutionalized training in teacher education**

Successful curricula and methods for teaching outdoors needs to be integral with teacher education. The Boston Schoolyard Funders Collaborative advocates the training of outdoor teaching skills as part of the school department's teacher training (Meyer 1999).

- **administrative and staff support**

At Berkeley's Edible Schoolyard, staff were hired to manage the garden and assist teachers with lesson plans. The school's principal equates the garden with other school resources, such as a computer lab or library, where staff support is essential (Comnes 1999).

6.4 Informed, Innovative Planning and Design

Landscape architects who design school landscapes need to draw upon and advocate for institutional support, community partnerships, and supportive pedagogy. These conditions are necessary for informed and innovative planning and design. As innovative processes evolve and places are created, their stories need to be shared. The profession's literature, conferences, and continuing education programs can play vital roles in disseminating information and examples of best practices. Continued research of the

qualities and values of successful learning environments is needed. This research can inform design practice and strengthen the case for all school landscapes to be conceived and developed as outdoor learning environments. The case studies and examples discussed here highlighted essential components to enriching design:

- **inclusive design process**

An inclusive design process can raise critical issues, provide unique insights into a landscape's meanings, and build vested community supporters. Through their firm's design work at TT Minor and Dearborn Park Elementary, Randy Allworth and Dale Nussbaum brought together community and school members, and individuals learned from each other why issues are important and how obstacles may be overcome. Site and program priorities can be identified through consensus, and this can lead to a masterplan and design that expresses broadly supported goals. As primary users of school landscapes, children need to be meaningfully involved in the design process, in ways that the process is linked with curriculum to foster multiple benefits. Children's participation in design and construction, like adults' participation, can foster a vested interest in the landscape's future.

- **inherent potentials of place**

Informed, innovative design builds upon unique qualities inherent in each site and potentials of its community. An inclusive design process at T.T. Minor Elementary raised insights about the site's potentials, and served as a community-building process (Biondo 2000). Dearborn Park Elementary's international garden provides unique understandings of the homelands of the school community and creates social spaces for students to gather at the start and end of their school days. Meadowbrook Pond's sculptural landforms literally rose out of the pond, as the design team creatively used the excavated material to shape a powerful sense of place with the earth and construction savings redirected to artworks.

- **broadened awareness and support**

A growing professional literature on the design of learning environments can serve as a basis for practice and for greater awareness of and institutional support for school landscape development. Local initiatives should be celebrated in the media as educational and ecological infrastructure for the school and the larger community. For example, national media attention and a published monograph have made Berkeley's Edible Schoolyard a model for other schools to follow, and a Foundation supporting similar projects grew out of Alice Waters' personal investment in this project. Landscape architects need to share successful projects and research with local, state and national policy makers.

- **cross-disciplinary dialogue**

The making of school landscapes as educationally revealing places requires collaboration of many disciplines and interests. To be effective in planning and design, landscape architects need to understand these perspectives and educate others about landscape architecture's unique contributions, as the case studies illustrated. Designers' participation in other organizations and boards, such as the National

Association for Environmental Education, the Council of Educational Facility Planners International, and state education facility boards is essential to build the bridges necessary for more informed, innovative, and valued outdoor learning environments. Design teams need to include varied disciplines to enhance landscape curricular potentials and community values.

School is inside as well as outside. Today's children deserve the opportunities of previous generations: to experience diverse sights, sounds, smells, and textures of their natural and cultural communities. As Keats wrote, "Nothing ever becomes real till it is experienced" (Allen, p. 11). Learning becomes real through experience. With innovative practice and engaging processes, landscape architects can create enriching landscapes for children, their families, and their community.

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RESOURCES

Citations in the References Section serve as literature resources related to specific discussion within the paper. This Resources Section lists selected websites and publications related to:

1. organizations and programs focusing on the design of school landscapes; and
2. organizations and programs offering grants and/or supportive curriculum or references related to outdoor learning environments.

1. Design of School Landscapes

selected programs

Center for Ecoliteracy

<http://www.ecoliteracy.org>

This site is not yet developed.

Center for Environmental Education of the Antioch New England Institute

<http://www.cee-ane.org/>

This site provides examples of "ecological literacy programs," as well as web links, a library, bookstore, and other resources.

Evergreen Foundation Learning Grounds Program

<http://www.evergreen.ca>

This Canadian program is dedicated to transforming Canadian school grounds into natural learning environments.

Learning Through Landscapes

<http://www.ltl.org.uk/>

"LTL is the national charity dedicated to helping schools across the UK to improve their grounds for the benefit of children, the school and society as a whole."

Natural Learning Initiative

<http://www.naturalearning.com>

"Creating environments for healthy human development and a healthy biosphere for generations to come." With Professor Robin Moore as its director, this initiative is "a research and extension program of the School of Design, North Carolina State University, USA." The site includes a detailed presentation of the Blanchie Carter Discovery Park, designed by Robin Moore, that is discussed in Section 3.1.5.

National Wildlife Federation's Schoolyard Habitat Project
<http://www.nwf.org/habitats/schoolyard/program.cfm>

web-based information, and sources for books and publications:

Center for Environmental Education of the Antioch New England Institute book store
<http://www.cee-ane.org/center/books/ppdm.html>

Green Brick Road
<http://www.gbr.org>
Distributes publications of Learning Through Landscapes in North America.

National Clearinghouse for Educational Facilities
<http://www.edfacilities.org>
As part of the US Department of Education's Educational Resources Information Center (ERIC), this Clearinghouse contains material on school planning, design, construction, and maintenance, with hot topics addressing specific issues.

Outdoor and Experiential Education database through ERIC (U.S. Department of Education's Educational Resources Information Center)

www.ael.org/eric/outdoor.htm
This database offers digests of educational literature, an outdoor education directory, conference listings, bookstore, and listing of new resources.

2. Grants and/or Supportive Curriculum or References

Association for Experiential Education
<http://www.aee.org/>

ERIC (U.S. Department of Education's Educational Resources Information Center)
"Information Sources for Environmental Education"
<http://www.ericse.org/digests/dse98-10.html>

Expeditionary Learning Outward Bound
<http://www.elob.org/>

The Foxfire Fund, Inc.
<http://www.foxfire.org/>

Greenmap
<http://www.greenmap.org>

Landscape Explorers

Curriculum "designed to teach elementary-school students about the importance of landscape and place in everyone's lives. (Landscape Architecture, November 1998, p. 73). This curriculum was jointly developed by the Arnold Arboretum of Harvard University and the National Park Service's Frederick Law Olmsted National Historic Site, drawing from the context of Boston and the Arboretum.

National Wildlife Federation's Schoolyard Habitat Project

<http://www.nwf.org/habitats/schoolyard/program.cfm>

New Horizons for Learning

<http://www.newhorizons.org>

This nonprofit organization is "an international network of people, programs, and products dedicated to successful, innovative learning." Its website contains resources and publications, with a section dedicated to "Grounds and Gardens/Environmental Education." Resources and links to curriculum planning and curriculum programs such as Project WILD and Project WET.

Project Learning Tree

<http://www.plt.org/>

State Education and Environment Roundtable

<http://www.seer.org>

Website includes articles illustrating learning through an environmentally integrating context (EIC).

The Urban Ecologist, 1998 Number 2: An extensive listing of web-based and published resources for environmental education in k-12 and higher education by Deirdre Holmes offers additional resources, with valuable case studies presented within the journal issue.