

Building a Sustainable Future: Ecological Design in Schools

By Miho Trudeau

The curriculum embedded in any building instructs as fully and as powerfully as any course taught in it.

—David Orr

It is no surprise that many environmental education programs include outdoor experiences as a foundational part of their curriculum; after all, who better to teach ecological lessons than nature itself? In contrast, there are inherent challenges to teaching environmental education while restricted inside a classroom—at least in the standard classrooms that you will find in most schools. The average student currently spends two-thirds of the year—seven hours every Monday through Friday—in classroom environments. As educators and former students ourselves, we can all easily visualize the standard school: a concrete box that contains multiple climate-controlled, rectangular classrooms, often devoid of natural elements such as plants, fresh air and sunlight. The sheer amount of time spent by youth in these built environments demands greater attention to their design. This article asks, “How can we design schools that will facilitate opportunities for environmental education?” Also, “How can we create places of learning that instill environmental values?”

The Not-So-Hidden Curriculum

There are many implicit lessons taught by the design of buildings. David Orr (2002) suggests that common educational structures “are provisioned with energy, materials, and water, and dispose of their waste in ways that say to students that the world is linear and that we are no part of the larger web of life” (p. 128).

School users know very little about where the energy, materials or water that are used in their buildings comes from or how much is used. While locked in strictly controlled classrooms—often with little outside view—there is little connection to any natural

environment. We cannot adequately address the concerns of environmental education while teaching in places that contradict essential lessons of interconnectedness. For example, students are being taught to conserve energy while their school is lit 24 hours a day and is inefficiently heated entirely through energy generated by a coal-burning plant. These kinds of contradictions implicitly teach learners that the built environment is unimportant in terms of environmental consideration—a harmful fallacy considering that the energy required to run buildings as well as their embodied energy is the cause of nearly one-half of all greenhouse gas emissions and energy consumption (Royal Architectural Institute of Canada, n.d.).

Make It Green

Just as buildings can influence users to believe that energy is cheap, materials have no origins, water is limitless and, in general, buildings are not connected to the outside world, they can also instruct otherwise. As institutions of education, public schools can be models of sustainability. Incorporating “green building” aspects into schools provides an opportunity for students to learn about ecological systems while reducing a schools’ environmental impacts. Strategies such as zero waste, food and water harvesting and energy efficient systems and materials can all be integrated into the design of educational structures.

While teaching in Kyushu, Japan’s southernmost main island, I visited a small coastal junior high school that used solar panels to generate electricity. In the school’s main hall there was an electrical panel that kept track of the percentage of the school’s energy that was generated by the solar panels. Students could easily observe the energy relationship between the building and the sun. If students wanted to test their user impact on the building’s energy needs, this could also be easily done.

A similar kind of relationship with the sun could also be demonstrated in a school with south-facing windows. Students would have the opportunity to learn about the importance of building orientation and solar energy and, with access to windows, students would also experience the natural diurnal cycle. Furthermore, daylight in classrooms has been documented to significantly improve student achievement (Heschong Mahone Group, 1999).

Digging Deeper

Including “green” technologies in buildings is important, but design intentions can go deeper than simply increasing ecological efficiency. Stephen Kellert (2005), social ecologist and founder of the design philosophy “restorative environmental design,” describes much more comprehensive goals: “Restorative environmental design incorporates the complementary goals of the human body, mind, and spirit by fostering positive experience of nature in the built environment” (p. 5).

Kellert describes the need to be in contact with nature as a prerequisite for human health. He cites research findings describing how contact with nature can help humans recover from illnesses, foster social relationships, reduce stress and enhance work performance. There is also a growing body of research documenting the detrimental effects of human separation from nature. The disassociation of children from nature or “nature deficit disorder,” as described by Richard Louv (2005) in his well-documented book *Last Child in the Woods*, is linked to many health problems such as obesity, depression and attention deficit disorder.

Take Me Outside

In addition to these health concerns, children’s alienation from nature is also compromising their relationship to the environment. The more time youth spend enjoying a natural environment, the more ecologically aware they will become later in life. Louise Chawla (2006) describes how

positive experiences in natural areas during a person’s youth will help build environmental values. Our schools need to make provisions for this predictor; how can youth be expected to experience the natural environment while housed in concrete blocks with fluorescent lighting, few windows and recycled air?

Amidst growing curriculum expectations, restrictive schedules, liability concerns and limited access to funds and outdoor spaces, it is difficult for the average urban class to access the natural world. During my last teaching experience in an inner-city middle school in Calgary, it was fortunate if a teacher was able to secure a classroom with windows uncovered by metal mesh that could open to fresh air. The only significant time students could spend outside was during their lunch hour. However, most students remained indoors due to cold weather and the common complaint of “nothing to do” outside—the middle school grounds consisted of one poorly maintained soccer field and a half-dozen birch trees. I was surprised when many of the new Grade 5 students complained of being unable to access the adjacent elementary school’s playground. It often seems that many of our middle and secondary schools do not see the importance of developing schools grounds—a simple lawn will do.

Conversely, I have also observed many examples of elementary schools that have incorporated natural design into their school grounds. Naturalized playgrounds where children have access to trees, plants, rocks and other natural objects such as tree stumps, which are quite popular, are becoming more and more common. During my last aforementioned teaching experience in Calgary, I lived across from an elementary school that had naturalized areas inspired by the surrounding prairies and woodland geographies.

Another example of primary schools and early childhood educational institutions that focus on getting students into the natural world are the growing number of outdoor schools for young children in Scandinavia and Germany. In Germany alone there are over 700 “forest kindergartens” (Esterl, 2008).

Closer to home, there are now two “forest schools” for preschoolers that have opened in Ontario—one in Thunder Bay (Holloway, 2008) and another in Carp Ridge (CBC, 2008).

Bringing the Outside In

It may be much easier for early and primary educators to bring learners into nature since many curriculum outcomes can be met whether inside or out. When it comes to middle and secondary education, getting into nature can become more difficult. However, schools can incorporate design features that help students and educators access the natural world. Spaces in buildings that blur the line between “outside” and “inside” encourage the idea of interconnectedness with the environment. For example, bringing the “outside” in could be achieved by creating more glazed surfaces in a building that allow for natural light and plant growth (Moore and Cosco, 2007). Vice-versa, building basic outdoor shelters such as gazebos can help bring “inside” users outside for class. Imagine having access to an outdoor classroom, so that even a math class could easily move outdoors for the period. In terms of some subject material, such as the natural sciences, spaces that are conducive to outdoor education allow teachers to make lessons much more experiential. Learning in a school should not be limited to classrooms but also reach beyond onto school grounds.

There are many ways to design schools and their surroundings to embody and teach ecological principles, both explicitly and implicitly. The construction of educational institutions is just as important as what is taught within them. Integrating ecologically efficient technologies, developing outdoor learning spaces, and “bringing the outside in” are all strategies that can be employed to foster greater ecological awareness in students. Building a sustainable future literally begins with the foundation!

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