

deconstructing 'green'

a holistic approach to designing sustainable child development centers

by Charles Durrett and Louis Torelli

As care providers of young children, the early childhood profession is poised to be on the forefront of the green revolution. Sustainability, by definition, is the art and science of leaving for future generations, opportunities equal or better than those left us. There is no better place to employ this philosophy of sustainability than in child care. Child



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care deals in future generations, the benefactors of our consciousness. While addressing children's immediate care needs, we must always be cognizant of the world they will live in as adults. For years, I argued with my neighbor about how much water he wasted watering the sidewalk in front of his house. Then on August 2nd, 1991 at 5 pm I changed. Our newborn came into our house. Visitors were tracking sap in from the sidewalk. I saw germs the size of dinosaurs being tracked into the house. Within minutes, I was out there with buckets of soapy water, a scrub brush in my hand and bent over on my hands and knees scrubbing. And then a hose, rinsing it all down. You can see how fast we lose sight of the world beyond our own children. Thinking about children before

we hold them in our arms requires us to be very intentional about the choices at hand — and not compromise our principles.

But doesn't green cost more?

The added 'cost' of a green constructed facility is about 5%. For example, we pay an extra 5% to purchase wood that comes from sustainable forestry practices — practices that don't destroy precious habitats, nor watersheds, nor future forests, etc. — leaving enough trees to purify the air for our future. I say 'cost' because the real costs of not developing a new center this way far exceeds the additional 5% 'cost'. What is truly vexing is that the typical developers of new centers routinely (as in 90%



of the time) pass up opportunities for 20% savings in the cost of their new center to actually make the facility more sustainable. That is, build it for 20% less but more sustainable. For example, we use much more wood than necessary and we use the wrong insulation — insulation that is not recycled, is chock-full of known carcinogens, and does not save much energy. There is a very, very long list of excellent and benign building materials today that require a little skill to locate and use in any location. But in America, as a culture, we want stuff, not necessarily skill. A few years ago we had a client who wanted three sustainable centers. We specified everything down to the kitchen sink, literally. Between the two contending sink manufacturers, the client asked that we check which had the best maternity leave policy. Since the quality and the costs were neutral, the center chose to purchase from the manufacturer with the most favorable maternity policy. Choosing a manufacturer based on the company's family benefits is an example of green practices extending beyond a building material or construction method.

There are hundreds of ways to save money when designing sustainable centers. One is to develop the outdoor environment with elements such as covered play areas, gardens and nature, construction, dramatic play, and gross motor areas. Creative use of outdoor space to maximize interacting with the environment is a vital component for early childhood centers and is essential to a sustainable program. While it's not a replacement for the building, a well-designed outdoor environment can, in effect, expand the childcare facility. These are not only less toxic and less consumptive than buildings, but they all contribute to a much richer child development program. They are also much less costly! Child care facility construction costs can be as high as \$350 a square foot. Since outdoor spaces can be developed for as little as \$25 a square

foot, this can be a particularly beneficial design strategy when a program does not have the funding to develop a facility with more preferable, generous-sized classrooms.

Consider the center in Denmark which I designed while living there. The school invested in comfortable raincoats and colorful rain boots for the children. Every day included lots of outdoor play and each day was an adventure. Placing the play yards directly outside every classroom supported the indoor-outdoor curriculum and made it easier for children to naturally break up into small groups.

I believe that children who grow up in environments that are wisely planned and used will in turn use their future opportunities more wisely. That's sustainable — an enduring cycle of using our share and no more. Can we even afford to think of it any other way? Not really.

Going green: Where to begin

In order to answer this question, it's important to get past the gimmicks and green-washing that we are targeted with every day and get to the heart of what it means to be sustainable. Simply put, sustainability is the ability to create, use, and maintain something indefinitely without having a net negative impact on the environment. Green-washing is the all too common practice of an organization inaccurately promoting a product or practice as 'green' when in fact it has no positive effect on the environment, and, in many instances, may cause a negative environmental impact. A good definition for maximized sustainability or 'greenness' needs to be two-fold:

1. The use of as few resources as possible, both directly and indirectly during construction and throughout the lifetime of the facility.
2. The limiting of negative health

impacts, both direct and indirect, to the users and non-users of the facility during its construction and throughout its lifetime.

In a nutshell, to be green is to be efficient and healthy.

Efficiency

Certainly, renewable and recycled materials and building systems that minimize resource consumption are efficient, but efficiency extends beyond materials and systems. To be green is to avoid redundancy and to make the most directly sustainable decision at every juncture. It is greener to:

- design a center so that it does not require air conditioning than to install an efficient air conditioning system.
- provide plenty of natural light than to use solar power to light the center during the day.
- program a center carefully before beginning the design process than to deal with the inefficiencies of backtracking during design, or even modifications after construction or years down the road.
- locate a center near existing mass transit than to provide a shuttle.

The list goes on and on. The key thing to remember is that redundancy is at the heart of resource depletion and should be avoided whenever and wherever possible.

It is also important to recognize that being green extends to the construction site and process, such as limiting waste during construction and specifying that all construction debris is recycled. Design details are only as green as their implementation. Education and oversight are necessary to guarantee that the reasoning behind important details isn't lost to status quo construction techniques.



those who utilize the center, both physical health and emotional health. Certainly, low- or no-VOC (volatile organic compounds) materials, hydronic heating, and natural ventilation are important for better air quality. Equally important considerations include lighting, acoustics, and classroom and play yard layout, furniture selection, textures, aesthetics, and location. Of course,

To make sure that opportunities for greater efficiency are not lost, it is often valuable to think outside the box:

- What services already exist in the community that could be utilized by the center and don't need to be repeated or reinvented?
- What services does the community need that the center can provide so that they don't need to find a home elsewhere?
- When the center is not being used for

its primary purposes, are there complimentary uses that can be accommodated in the off hours?

As we broaden our scope of what it means to be green, it becomes evident that there are limitless possibilities for creativity and ingenuity.

Health

The second key component of the definition of 'green' involves the health of

essential to a healthy environment are quality staff, appropriate pedagogy, and active parent and community involvement. We are still in our infancy when it comes to understanding the depth and reach of the impact of our decisions on the health and well being of ourselves, our society, and the planet as a whole.

Compromise

Unfortunately, the sustainability equation is not as simple as $A + B = \text{Green}$, as 'B' might be negative or 'A' might not be in the budget. Compromise is a part of life, even when our intention is relatively selfless.

- We might only have enough roof

The Science of Space Planning: Designing Emotionally Healthy Classrooms

Without a thoughtful space plan, many classrooms end up feeling like rooms that house equipment rather than a sculpted learning environment. Well-designed classrooms evoke a sense of security, support exploration, and give young children a sense of control, enabling them to engage in focused, self-directed play. A well-designed classroom also makes accommodations for the teaching staff and creates a comfortable work environment. A sculpted learning environment will significantly increase the efficiency of the space, which, in effect, creates a bigger classroom with more options. Key classroom design criteria include:

Room Size: A minimum of 50 square feet of usable space per child. Child-usable space does not include areas used for diapering/toileting, food preparation, or space occupied by base cabinets, floor storage, and cribs.

Small Groups: 6 - 8 infants; 8 - 12 toddlers; 16 - 20 preschoolers

Plumbing: Child-height sinks in diapering/toilet area and in classroom. Separate adult sinks for diapering, for food preparation, and art and general activities.

Indoor/Outdoor Access: Direct access from every classroom to the outdoor play area. Direct access expands the classroom learning environment and makes it easier to support an indoor/outdoor curriculum throughout the day. Direct access to the outdoors also makes it easier for children to engage in physical activity, interact with the natural world, and play in a more carefree manner.

Healthy Environment = Green Design

The primary function of a child care facility should be to house a program that supports children's learning and development. It should also be a comfortable workplace for staff and a welcoming place for families that feels and functions as a community. Recognized best practices that support these goals include:

- High Teacher:Child Ratio – 1:3 infants; 1:4 toddlers; 1:8 preschoolers
- Qualified and well compensated staff

space for either solar thermal or photovoltaics or we might not have enough money for either.

- A two-story design could minimize the building's footprint but create a less healthy and safe environment for children by eliminating direct access to the outdoor play area.
- Close proximity to a freeway might reduce driving times for staff and parents, but reduce the air quality and increase the noise level at the center.
- The most long lasting, durable materials may not be the most ecologically harvested, extracted, or manufactured and may not be recyclable or bio-degradable.

In conclusion, we have a wonderful and unique opportunity to influence our path as a species. It is important that we approach this path with research, creativity, and vision. We should do thorough analysis in order to understand our options. We should use our creativity to minimize any negative impact, while promoting health and wellness for all beings. Throughout the entire process, we should never lose sight of the big picture. We should let our vision of a child care center be in harmony with the natural environment and guide all of our choices, no matter how small.

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Facility design web sites

- www.spacesforchildren.com
- www.edfacilities.org
- www.designshare.com
- www.chps.net (The Collaborative for High Performance Schools — Healthy Green Schools)



“What was the architect thinking?”

This is a comment I hear constantly from directors and teachers when conducting workshops on the environment. As the primary users of classroom space, staff are at the receiving end of the oversights and mistakes made when designing a child care facility. Often, this is due to a lack of involvement, or minimal involvement in developing the vision, goals, and details of the building. In order to create a facility that supports the goals of the child development program, it is essential that the end users (directors and others) be active members in a participatory design process to generate a thorough Program Document prior to drafting a building design. This should involve a series of meetings where the design team (architect, early childhood specialist, director, and teachers) identifies the vision, goals, and details of the center through a process of discussion, debate, and, consensus on every component of the design. For example, many programs serving infants and toddlers create the same basic room plan whether the classroom serves young infants, toddlers, or a multi-age infant/toddler group. This approach generates problems when teachers try to develop an appropriate learning environment. Even though they may serve the same number of children in each age group, to function appropriately, a room for 8 toddlers should be larger than a room for 8 infants. A multi-age infant/toddler room for 8 children should be even larger, to provide a safe space for the younger infants, and additional space for the more vigorous physical play and expanded curriculum older toddlers engage in. The Program Document guides the architect, making it more likely she or he will succeed in designing a facility that manifests the vision of the child development program. It will save money due to less backtracking during the design phase, and fewer change orders during construction. It will also avoid the need for remodeling after construction is completed. The longer a building lasts and works well, the more ‘green’ it is.

— Louis Torelli

Building Materials and Systems

Site placement: Building location and layout should minimize displacement of valuable ecosystems/habitats. Building location, orientation, and layout should maximize passive solar design potential. Photovoltaics should be accommodated by building orientation and roof design.

Passive Solar Design: Building should be designed to maximize potential for natural heating and cooling. Window locations and overhangs should prevent solar heating during the warm months and accommodate it during the cold months.

Materials: Materials should be sustainably harvested, extracted, and manufactured. They should be made of renewable resources whenever possible and maximize recycled content. Avoid construction materials that contain volatile organic compounds (VOCs). These include adhesives, synthetic carpeting, particleboard, and paints. Instead, utilize woods, paints, stains, carpets, and furnishings that have low- or no-VOCs. Avoid vinyl flooring, which is a petroleum-based product. 'Green' flooring options include linoleum, cork, bamboo, and wool carpeting. Materials should be long lasting and durable. Biodegradable materials should be utilized where appropriate.

Lighting: Design facilities with generous amounts of natural light. Interior windows between rooms can help provide a more transparent, open feel. The interior lighting plan should reflect the overall layout of the classroom, and include a variety of recessed, pendant, and track lights using energy efficient compact fluorescent bulbs (CFL) or newly developed LED lighting.

Power: Photovoltaic power is an investment that pays off over time. Some roofing systems now incorporate integrated photovoltaics.

Appliances: All appliances should be as efficient as possible (Energy Star[®] or better).

HVAC: Heating, ventilation, and air-conditioning systems should be seen as backup for good passive solar design and natural ventilation. Hydronic heating is efficient and helps maintain good indoor air quality. Radiant floor heating is ideal. Solar thermal and highly efficient water heaters and boilers can be utilized to maximize the efficiency of a hydronic heating system. Whole house fans, ceiling fans, and lots of natural ventilation are sufficient in many climates. Appropriate air filtration should be provided.

Plumbing: Fixtures should be low-flow. Hot water should be on-demand. Install mixing valves at children's hand washing sinks to regulate temperature to a maximum of 110 degrees F. Gray water should be reclaimed for landscaping if possible.

Acoustics: A noisy environment is a mentally and emotionally unhealthy environment for children and staff. High quality acoustical tiles will help to mitigate noise. Materials should be as sustainable as possible.

Construction: Construction debris should be recycled. Existing vegetation and habitat should be carefully protected. Storm water pollution should be protected against. Airborne dust and dirt should be minimized and controlled.

Insulation: Building should be well insulated using recycled content, formaldehyde-free materials. Windows should have a thermal break and low-E, dual-pane glazing. Building should create an airtight envelope when natural ventilation is not being utilized.

Landscaping: Landscaping should consist of a regionally appropriate, water-conserving plant mix that replicates a natural, indigenous ecosystem. Irrigation, where necessary, should be as efficient as possible. Rain water should be retained on site and allowed to filter back into the ground. Edible landscaping should be utilized where possible. Parking areas and walkways should be of permeable paving.

