High Performance Sustainable Schools

The Benefits of Buildings for Education

Holiday Inn Capital Plaza
Frankfort, Kentucky
Tuesday May 10, 2005

Robert J. Kobet, AIA
President, Sustainaissance International, Inc.
What is Green School Design?
Combining the Physical Environment and the Education Process

First challenge - getting beyond the pieces.

Weaving the tapestry of the Elements of school design with pervasive Concepts in education with The Education Delivery process.
High Performance Green Design Principles

**Human Ecology**
- Allergy free non-toxic design
- Ergonomics and Comfort
- Total environmental quality
- The need to educate

**Natural Ecology**
- Reduced environmental impacts
- Less use of extractive industries
- Solar Income and renewable energy sources

**Building Ecology**
- Daylighting
- Natural Ventilation
- Non toxic operation and maintenance
Where are we going? Are high performance green schools compatible with emerging trends?

Schools are expensive and last a long time. When we build new schools or modernize new ones, it is important to consider how we think about and deliver public education. Although no one can predict the future, we have an obligation to identify evolving attitudes and practices and to try our best to understand how they might effect the physical settings we use for learning.

Kenneth R. Stevenson, Ed.D
Typical School District Issues

- Budget
- District Requirements
- Facilities Programming and Design
- Community Education and Connections
- Design Approach

Typically vary with urban, suburban and rural districts
We are getting a lot of attention and a lot of scrutiny

Progress Report on Sustainability
Building Design and Construction Magazine November 2044

Building Healthy, High Performance Schools: A Review of Selected State and local Initiatives
The Environmental Law Institute

And a cast of thousands!

Environmental Protection Agency, the Department of Energy, the Council of Educational Facility Planners International, the American Institute of Architects, the Sustainable Buildings Industry Council, The US Green Building Council, the Collaborative for High Performance Schools, etc.
We know the benefits of High Performance Green Schools:

Energy, Material and Resource Efficient
Healthy and productive learning and working environments
Effectively day lit
Stimulating and pleasing places
Acoustically superior
Easier and less costly to operate and maintain
Reflective of local culture and other institutions
Community resources
Great recruiting tools
Flexible and adaptable
Did you know?

- Each school day 50 million school children and 6 million adults enter our schools; each of whom are directly effected by the physical environment.

- 20% 0f the US population suffer from allergies and a heightened sensitivity to airborne contaminants. – US EPA

- Children lose six million asthma days per year in K-12 schools. – US Department of Education

- Businesses lose 60 million work days per year due to problems related to indoor air quality – US EPA

Cocktail party conversation or critical life cycle cost information?

Is this stuff really important?
Have you ever heard of......

- Sick building syndrome
- Building related illness
- Multiple chemical sensitivities
- Phenocyclehexane (4pc)
- Formaldehyde (HCOH)
- Incitants of chronic illness
- Clinical ecology
- Green Architecture
- CHPS
- USGBC LEED™
- Eco-friendly interiors

Do we understand the connections?

Cocktail party conversation or necessary information?
What do we need to know?

The consequences are real
Why Build High Performance Green Schools?*

• Better student performance
• Increased average daily attendance
• Increased teacher satisfaction and retention
• Reduced operating costs

“I have noticed a big difference in my health since we’ve been in the new school. I had a lot of absenteeism – in fact I was hospitalized in the old building. In the new school, I won’t say I’m cured of asthma – I still have it and I still have allergies – but I really don’t have many problems at all and I’m feeling great.”

Teacher at a new school in New Hampshire using the Advantage Classroom design concept.

*High Performance School Buildings  Sustainable Buildings Industry Council
Why Build High Performance Green Schools?

- Reduced liability exposure
- A positive influence on the environment
- Increased opportunities for using the facility as a teaching tool

“High performance facilities are a critical part of the equation for improving student outcomes in this country.”

Jack Lyons
Educational Facilities Program Manager
U.S. Department of Education, retired

*High Performance School Buildings  Sustainable Buildings Industry Council
What are they saying?

From Progress Report on Sustainability - Building Design and Construction
November 2004

Progressive Districts Promoting High Performance Schools

<table>
<thead>
<tr>
<th>Have you incorporated sustainability in current school projects?</th>
<th>If you have used sustainable design in building projects has it improved student performance?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>Yes, quite extensively</td>
<td>21%</td>
</tr>
<tr>
<td>Yes, somewhat</td>
<td>49%</td>
</tr>
<tr>
<td>No, but we plan to do so</td>
<td>11%</td>
</tr>
<tr>
<td>No</td>
<td>20%</td>
</tr>
<tr>
<td>Base</td>
<td>437</td>
</tr>
</tbody>
</table>

The overwhelming majority of school districts (81%) have used sustainable design or plan to do so, according to respondents.

The case for improved student performance in green schools has not been made, judging from these results, but anecdotal evidence is intriguing. One respondent wrote, “Standardized test scores rose fairly dramatically” after a year at one high-performance school.
What are they saying?

From Progress Report on Sustainability - Building Design and Construction
November 2004

Progressive Districts Promoting High Performance Schools

How familiar are you with?

<table>
<thead>
<tr>
<th>...the term “sustainable design” or “green building”?</th>
<th>Total</th>
<th>ASBO</th>
<th>CEFPI</th>
<th>NSBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very familiar</td>
<td>52%</td>
<td>27%</td>
<td>69%</td>
<td>12%</td>
</tr>
<tr>
<td>Somewhat familiar</td>
<td>30%</td>
<td>40%</td>
<td>27%</td>
<td>37%</td>
</tr>
<tr>
<td>Have heard of it</td>
<td>10%</td>
<td>30%</td>
<td>3%</td>
<td>24%</td>
</tr>
<tr>
<td>Never heard of it</td>
<td>9%</td>
<td>3%</td>
<td>1%</td>
<td>27%</td>
</tr>
<tr>
<td>Mean (scale of 4)</td>
<td>3.28</td>
<td>3.26</td>
<td>3.64</td>
<td>2.33</td>
</tr>
<tr>
<td>Base</td>
<td>435</td>
<td>30</td>
<td>302</td>
<td>103</td>
</tr>
</tbody>
</table>

| ...the CHPS Best Practice Manual?                   |       |      |       |      |
| Very familiar                                       | 16%   | 3%   | 22%   | 4%   |
| Somewhat familiar                                   | 23%   | 13%  | 27%   | 13%  |
| Have heard of it                                    | 28%   | 47%  | 25%   | 30%  |
| Never heard of it                                   | 33%   | 37%  | 26%   | 53%  |
| Mean (scale of 4)                                   | 2.22  | 1.83 | 2.45  | 1.67 |
| Base                                                | 435   | 30   | 302   | 103  |

| ...LEED?                                             |       |      |       |      |
| Very familiar                                       | 42%   | 17%  | 57%   | 8%   |
| Somewhat familiar                                   | 26%   | 33%  | 29%   | 17%  |
| Have heard of it                                    | 12%   | 27%  | 8%    | 21%  |
| Never heard of it                                   | 19%   | 23%  | 6%    | 54%  |
| Mean (scale of 4)                                   | 2.92  | 2.43 | 3.37  | 1.78 |
| Base                                                | 434   | 30   | 301   | 103  |

Most respondents (61%) said their school districts have some experience in green buildings, with another large group (27%) expressing interest.

How would you describe the level of expertise about green buildings in your school district?

CEFPI members displayed the highest level of familiarity with sustainability, CHPS, and LEED among the three groups surveyed.
**What are they saying?**

**From Progress Report on Sustainability - Building Design and Construction**

**November 2004**

**Progressive Districts Promoting High Performance Schools**

<table>
<thead>
<tr>
<th>Total</th>
<th>ASBO</th>
<th>CEFPI</th>
<th>NSBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, but they’re worth it</td>
<td>51%</td>
<td>47%</td>
<td>60%</td>
</tr>
<tr>
<td>Yes, and they’re not worth it</td>
<td>13%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>Green schools not more costly</td>
<td>10%</td>
<td>3%</td>
<td>12%</td>
</tr>
<tr>
<td>Not sure</td>
<td>26%</td>
<td>33%</td>
<td>14%</td>
</tr>
</tbody>
</table>

While the majority of respondents (51%) see sustainability as worth any construction premium, and another 10% see no added cost, a substantial group just aren’t sure about additional added cost.

**Do green school buildings cost more to build?**

<table>
<thead>
<tr>
<th>Total</th>
<th>ASBO</th>
<th>CEFPI</th>
<th>NSBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5%</td>
<td>37%</td>
<td>10%</td>
<td>39%</td>
</tr>
<tr>
<td>Up to 10%</td>
<td>29%</td>
<td>43%</td>
<td>30%</td>
</tr>
<tr>
<td>Up to 15%</td>
<td>6%</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Up to 20%</td>
<td>5%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>&gt;20%</td>
<td>1%</td>
<td>-</td>
<td>1%</td>
</tr>
<tr>
<td>Mean</td>
<td>6.78</td>
<td>8.95</td>
<td>6.41</td>
</tr>
<tr>
<td>Median</td>
<td>6.26</td>
<td>8.31</td>
<td>6.02</td>
</tr>
<tr>
<td>Base</td>
<td>416</td>
<td>30</td>
<td>291</td>
</tr>
<tr>
<td>Not acceptable at any cost</td>
<td>14%</td>
<td>7%</td>
<td>14%</td>
</tr>
<tr>
<td>Green buildings do not cost more to build</td>
<td>8%</td>
<td>23%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Surprisingly, school business officials showed the greatest support for paying extra (8-9%) for green schools. However, the small sample size for ASBO should be noted.

**What initial cost difference would be acceptable to your district to get a green school?**
What are they saying?

From Progress Report on Sustainability - Building Design and Construction
November 2004

Progressive Districts Promoting High Performance Schools

Three-fourths of all respondents (75%) see green schools as learning laboratories. “The science behind the design allows for real world examples of innovation and cost effectiveness for students, staff, and community,” said one school board official.

<table>
<thead>
<tr>
<th>Group</th>
<th>Total</th>
<th>ASBO</th>
<th>CEFPI</th>
<th>NSBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5 Top 2</td>
<td>81%</td>
<td>90%</td>
<td>82%</td>
<td>77%</td>
</tr>
<tr>
<td>3 Mid-range</td>
<td>14%</td>
<td>10%</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>1-2 Bottom 2</td>
<td>5%</td>
<td>-</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>Mean (scale of 5)</td>
<td>4.17</td>
<td>4.43</td>
<td>4.19</td>
<td>4.04</td>
</tr>
<tr>
<td>Base</td>
<td>433</td>
<td>30</td>
<td>301</td>
<td>102</td>
</tr>
</tbody>
</table>

All three groups of respondents showed a high level of support for sustainability in school construction.

What level of consideration should be given to green design when a major project is being contemplated?

Can green buildings serve as a teaching tool?
And, if we know everyone involved in the design and construction of High Performance Green Schools are:

Trustworthy
Loyal
Helpful
Friendly
Courteous
Kind
Obedient
Cheerful
Thrifty
Brave
Clean
Reverent

and maybe even LEED© accredited!
Then what’s the problem?

Several articles and numerous publications support the allegation that High Performance Green Schools are

• more about people than buildings
• more about commitment than committees
• more about integrity than integration
• more about our children’s lives than life cycle cost
What are they saying?
From Building Healthy, High Performance Schools
A Review of Selected State and Local Institutions
The Environmental Law Institute

What are some things we do we need to do?

1. Approach the issues with a new mindset
2. Invest in a collaborative process
3. Avail ourselves of knowledge and feasibility of new materials, systems and tools
4. Integrate built environmental education via environmental education standards.
5. Use the most appropriate and effective ways to overcome client objections
6. Get beyond fixation with cosmetics and aesthetics
7. Overcome the persistent misconceptions of $$$ versus the environment
8. Invest in the physical facility as part of the education delivery process
What are they saying?
From *Building Healthy, High Performance Schools: A Review of Selected State and Local Institutions*
*The Environmental Law Institute*

What issues resonate most with the *Progress on Sustainability* report?

1. The belief that high performance green schools are more expensive than conventional construction.
2. The perception that high performance green schools provide only marginal returns that cannot be verified.
3. The belief that high performance green schools cannot be designed and constructed in ways that meet the pressure of increasing student populations and shifting demographics.
Building Program*

- Discharge no waste water, i.e. drinking water in, drinking water out
- Generate more electricity than it uses
- No materials that are carcinogenic, mutagenic or endocrine disrupters
- Use energy and materials efficiently
- Sustainably manufactured materials
- Landscape to promote biodiversity
- Promote ecological competence and be mindful of place
- Be genuinely pedagogical in design and operation
- Meet rigorous requirements for full cost accounting

* The Nature of Design – Ecology, Culture and Human Intention  David Orr

Adam Joseph Lewis Center  Oberlin College
In short, we have an obligation to equip our students to do the hard work ahead of...

- learning to power civilization by current sunlight
- reducing the amount of materials, water, and land use per capita
- growing food and fiber sustainably
- eliminating the concept of waste
- preserving biological diversity
- restoring ecologies ruined in the past century
- rethinking the political basis of modern society
- developing economies that can be sustained within the limits of nature
- distributing wealth fairly within and between generations

* The Nature of Design – Ecology, Culture and Human Intention    David Orr
Building high performance schools today is essential for the future of our nation and its students.

If you do not begin today, you are mortgaging the future of your children and your grandchildren.

If you do not start now, when will you start?

THE FUTURE IS NOW