How important is it to improve public school buildings in America?
How important is it to improve public school buildings in America?

90% \} Very or somewhat important

2013 SURVEY BY DAVID BINDER RESEARCH
Do you think the United States spends too much, just the right amount, or not enough on buildings and infrastructure in K to 12 schools?
Do you think the United States spends too much, just the right amount, or not enough on buildings and infrastructure in K to 12 schools?

55% } Not enough

2013 SURVEY BY DAVID BINDER RESEARCH
2013
STATE OF OUR SCHOOLS REPORT

$542 BILLION WOULD BE REQUIRED OVER THE NEXT 10 YEARS TO MODERNIZE OUR PRE-K THROUGH 12TH GRADE EDUCATIONAL INFRASTRUCTURE
THE CENTER FOR GREEN SCHOOLS
FELLOWSHIP PROGRAM
Job Title Themes

- Sustainability, 43%
- Facilities/Operations, 17%
- Conservation, 6%
- Other, 23%
- Energy, 11%
Net impact (waste, water, energy, CO₂)

Health & performance

Environmental literacy
The Impact of School Buildings on Childhood Health and Learning

Convened in Boston
October 2011
The Impact of School Buildings on Student Health and Performance

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HOW STUDENTS... SEE

Classroom lighting and visual experience

Research on lighting and classrooms has been conducted for over a century, but attention in recent years has focused on the importance of natural light, after a departure from natural lighting for two decades in the 1970s and 1980s. Part of the issue has been understanding more precisely why natural light seems to have good results in schools. Intuitively, it makes sense that daylight would enhance the learning environment. But, because school districts are asked to justify facilities decisions using quantifiable means, researchers have attempted to show more conclusively that daylight is objectively positive for schools. This research includes seeking objective information about specific daylight design strategies (like skylights, clerestories, frosted glass, etc.) to ascertain whether certain strategies are more beneficial than others in terms of student health and learning.

The visual qualities of a learning environment are some of the most crucial building aspects to design properly, since children depend heavily on sight in the learning process. In the early days of lighting research in schools, the focus was purely on quantity—in how much light to provide for given tasks. Quantity of light is largely agreed upon today. Less understood are issues of how light quality impacts student health. This question that follows then is, how to ensure that we achieve a truly high-performing visual environment through design.

What do we know today?

The impact of daylight on student health and learning has been thoroughly studied. Up until the 1970s, it was widely appreciated that natural daylight was necessary for healthy learning environments. But when the energy crisis hit in the early 1970s, designers began building schools with no windows to save energy. They conducted research at this time to test how the changes impacted students and found no discernible impact on test scores. Researchers did find that teachers and students were very dissatisfied, but they did not believe that these attitudes could impact student performance and, thus, did not deem the dissatisfaction critical (Baker, 2011).

School building professionals have learned from experience and we have begun to understand the biology of this phenomenon. For example, one study found that students without access to natural light showed a delay in seasonal cortisol production, a hormone that is positively associated with concentration abilities (Koller & Lindblad, 1992). More recently, Figuer et al. showed that light melatonin onset (MLDo) is delayed significantly (by 30 minutes) after a five-day intervention in which a group of 8th graders wore glasses that kept out short-wave (solar) light exposure while they were at school. MLDo helps entrain the circadian system, and thus, this study showed that an absence of short-wave light (daylight) can contribute to sleep problems in adolescents.

Regarding academic impacts, one well-known study showed that students in daylight classrooms had greater improvement over the course of one school year in math and reading standardized tests than students in windowless classrooms (Heschling Mahon Group, 1999). The numbers...
air that is unfit to breathe

AFT’s 2008 Building Minds Minding Building report cites a GAO study showing 15,000 U.S. schools suffer from indoor air that is unfit to breathe.
GREEN CLASSROOM PROFESSIONAL

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