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Study Says Natural Classroom Lighting Can Aid Achievement

By Kenneth J. Cooper
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School districts across the nation have scrambled to find a solution to dismal student performance on standardized tests, trying alternative curricula, different teaching methods, new textbooks, better trained teachers, smaller classes, tutors after school, Saturday sessions, even longer school years.

But for the most part, school officials have yet to take a close look at the physical space where learning takes place: the classroom. Could a partial solution to the achievement problem be to improve the lighting there?

A California architecture consulting firm thinks so, based on its study on the effect of classroom lighting on achievement levels. The study by the Heschong Mahone Group based near Sacramento found that students who took their lessons in classrooms with more natural light scored as much as 25 percent higher on standardized tests than other students in the same school district.

The study, billed as the first rigorous one of its kind, appears to confirm what some school designers have asserted based on anecdotal evidence: children learn better under illumination from skylights or windows, rather than bulbs. The main theory for why this might be the case is that "daylighting" enhances learning by boosting the eyesight, mood and/or health of students and their teachers.

John B. Lyons, an Education Department official who monitors school construction, was briefed on the study last month. "It's one of the first studies that shows a clear correlation" between daylight and achievement, he said. "I don't discount that at all."

Joseph Villani, associate director of the National School Boards Association, said the study focused on the kind of "human engineering" issues that boards should consider in awarding design contracts.

"It's almost common sense if you look at what people prefer," Villani said. "Most people prefer to have some daylight."

While the Heschong Mahone study is the first to evaluate daylight's impact on learning, earlier research in Canada found student achievement gains were "significantly greater" in classrooms where artificial lighting most closely approximated sunlight. The 1991 study conducted for Alberta's Education Department, subtitled, "A Case of Daylight Robbery," examined the impact of different artificial lighting systems on elementary students' test scores, health and school attendance.

The new daylight study, commissioned by the Pacific Gas and Electric Co. out of an interest in potential energy savings, comes as the nation is on a school construction spree--spending $20.5 billion this year--to

accommodate record enrollments. Its central finding runs counter to a theory of school design popular in the 1970s: eliminating classroom windows so that students would not be distracted by goings-on outside.

Test results were analyzed for 21,000 students in Seattle, Fort Collins, Colo., and Orange County, Calif., areas with divergent weather patterns. Within each of the three school districts, the results of students in classrooms that let in varying amounts of daylight were compared.

More daylight appeared to have the greatest effect in the Capistrano district in Orange County. "We found that students with the most daylighting in their classrooms progressed 20 percent faster on math tests and 26 percent [faster] on reading tests in one year than those with the least," the researchers concluded. "Similarly, students in classrooms with the largest window areas were found to progress 15 percent faster in math and 23 percent faster in reading."

In Seattle and Fort Collins, the impact of daylight was smaller, raising scores from 7 to 18 percent. The study used a sophisticated statistical method called regression analysis to control for the social characteristics of students, variations in class size and other factors known to affect learning.

"We were completely taken aback at the magnitude of these findings. . . . I would have been delighted to find a 5 percent effect," said Lisa Heschong, one of the study's authors. "It's an eye opener."

The study did not attempt to explain why students in classrooms with daylight scored higher. Heschong, an architect, said the theories of other researchers that make the most sense to her are better vision--artificial light cannot exactly duplicate sunlight--and better morale.

"Kids see better, or teachers see better," she said. "It may be that teachers feel better, are more motivated by daylighting."