Designing with Intent: A School's Building can Impact Student Learning

The goal of every school and college is to help its students fulfill their potential which is why, a seemingly endless stream of research studies have been – and continue to be – conducted to determine all of the factors that affect learning. But while the impact of issues such as socioeconomic background, internal motivation and disparate learning styles have been given a great deal of attention – and rightfully so – a matter of equal importance has been given comparatively little focus: how a school's design affects student learning.

In a study conducted by Professor Peter Barrett of the University of Salford's School of the Built Environment in Manchester, England, he and his team concluded that almost 75 percent of the variation in student performance they observed could be attributed either directly or indirectly to design and environmental factors.[1] The study also found that – all other things being equal – the students who were fortunate enough to enjoy the best environment could be expected to perform 25 percent better. These findings emphasize the need for architects to consider the impact their building designs have on a school's learning environment and suggest that elements with a demonstrably positive impact should be implemented in schools and colleges across the country.

One such feature is natural lighting. A 2014 study conducted in California, Washington and Colorado found that students in classrooms with exposure to daylight had math and reading scores between two and 26 percent higher than those who did not. Yet despite this fact, not all schools provide students with adequate natural light, thus creating a need for designers to incorporate elements such as windows and skylights to create healthy classrooms. They not only deliver natural light, but also offer a view of the outside world which, according to research conducted by the University of Illinois, Department of Landscape Architecture, can also help students perform better when that view is of a green landscape. The results of the 2016 study, which involved 94 high school students, showed that students with a green view outside their windows got higher scores on tests – and recovered from stress more quickly – than students in either a windowless classroom or one with a view of built space such as a building or parking lot.[2]

School designers need to take other environmental factors that affect students' ability to learn into consideration during the design process, including temperature, indoor air quality (IAQ) and noise. Studies have shown that the ideal temperature range for learning is between 68 and 78 degrees Fahrenheit, and student achievement is affected significantly the more dramatically temperatures move in either direction. This underscores the need for effective heating, cooling and ventilation in every classroom.

Considering the role ventilation plays on IAQ, it is one of the most important and easily overlooked components of the classroom environment and deserves extra attention. According to a study cited by the U.S. Environmental Protection Agency (EPA), students in classrooms with better ventilation rates, which helped to protect its IAQ, scored 14 to 15 percent higher on standardized test scores.[3] Poor IAQ can be caused by a range of pollutants and allergens including mold, dust, fumes from cleaning products, adhesives in carpet, wall coverings and furniture, and vehicle exhaust. Without proper ventilation, these substances can either build up in or enter the classroom, causing a variety of health problems for both students and teachers that can make learning and teaching difficult, and lead to absenteeism.

Research has also shown that excessive noise makes learning more difficult. For example, one study compared

the reading scores of two schools whose student bodies had identical demographics. However, one school was in the flight path of a major airport, while the other was located in a quiet neighborhood. Not surprisingly, the students at the quieter school had much higher scores than the students in the school near the airport.[4] Considerations for noise and proper acoustics should be a focus when designing schools.

Studying how classroom environments affect learning is a relatively new field, but it's obvious that these factors have a dramatic effect on student performance. While design isn't a silver bullet that can solve all of a school's problems, the evidence shows that designing with purposeful intent can provide a meaningful boost to academic performance.

[1] www.salford.ac.uk/business/consultancy/case-studies-nightingale-schools

[2] https://www.sciencedirect.com/science/article/pii/S0169204615002571

[3] https://www.epa.gov/sites/production/files/2014-08/documents/student_performance_slideshow.pdf

[4] http://journals.sagepub.com/doi/pdf/10.1177/2372732214548677

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