



Optimizing Conditions for Today's Higher Education





A strong and healthy system for higher education has been a foundation of the nation's economic health and well being for well over a century. Our nation was built on an educated population and an engaged citizenry.

Colleges and universities have long been a destination for the best and brightest students from all over the world. But are we losing our edge? Recent data from the Organization for Economic Cooperation and Development indicates the U.S. is now ranked twelfth among industrialized countries in higher education attainment. In response, President Barack Obama has established a goal that the United States will once again have the highest proportion of college graduates in the world by 2020.

According to a 2006 report by the U.S. Department of Education, *A Test of Leadership: Charting the Future of U.S. Higher Education*, in today's competitive global landscape, the future wealth of the nation will depend on the ability of our citizens to work smarter and learn faster, giving new importance to the quality of higher education. "At a time when we need to be increasing the quality of learning outcomes... there are disturbing signs that suggest we are moving in the opposite direction," the report stated.

The report called for colleges and universities to address shortcomings in educational quality and outcomes by "making a commitment to embrace new pedagogies, curricula and technologies to improve student learning." Further stating: "To meet the challenges of the twenty-first century, higher education must change from a

system primarily based on reputation to one based on performance."

Improving learning environments

Of course, there are many diverse aspects to higher education that can contribute positively or negatively to student performance. Administrators who are increasingly challenged by fiscal shortfalls due to declining state and federal funding and increasing enrollments will need to thoughtfully analyze how to prioritize spending to improve educational outcomes.

For the past few decades, educational researchers have been investigating the correlation between classroom environments and student and teacher performance. Numerous studies continue to make the link between classroom and workplace performance and such indoor environmental factors as air flow, lighting, acoustics, temperature and humidity. Studies dating back to 1979 found students performed mental tasks best in rooms kept at moderate humidity levels and moderate temperatures.

Less obvious than bricks and mortar, yet equally important, indoor environmental quality (IEQ) is indisputably linked to positive higher education outcomes. Not surprisingly, new classrooms with modern indoor climate control systems are the nation's top campus construction priority, accounting for 20 percent of new campus construction.

Most college building renovation projects also include upgrades to improve IAQ, with 54.6 percent of these

projects including an HVAC systems overhaul. High efficiency central plant chillers, rooftop units and building automation systems are being installed to enable the precise management of temperature and humidity levels to optimize learning conditions in classrooms all over campus. New systems and equipment can also be designed to reduce ambient noise distractions in classrooms and study areas.

Improving math and science programs

The United States currently lags behind other industrialized nations in the number of math, science and technology majors we produce each year. These fields are vital to our economic health and national security. Efforts to channel more students into math and science majors must begin in early grade school and carry through to our college campuses. By offering relevant curricula and state-of-the-art scientific research facilities, higher education can make these challenging fields of study more attractive to a broader body of students.

Top-notch indoor environmental quality control systems are essential to creating the type of research facilities that support student and faculty success. Experiments may require environmental conditions that are precisely and reliably maintained by building automation systems that closely monitor lighting, pressure, temperature and humidity. Elaborate exhaust and ventilation systems might be required to prevent cross-contamination of research materials, and to guard against harmful volatile organic compounds (VOCs).¹

Lab spaces must also be flexible, because new directions in research and emerging technology trends can change space requirements dramatically—and frequently. Without flexible spaces and environmental systems, the laboratories that are being built today will likely become obsolete within five years. Scientific technologies and instrumentation advance rapidly, and some experts estimate that only about a third of the existing science and engineering research space on college and university campuses is currently adequate to meet modern research program requirements.

Improving student retention and graduation rates

Much attention has been given to what it takes to get more students into college, yet little has been done to improve graduation rates. Only 66 percent of full-time

four-year college students complete a degree within six years.²

In response to rising student numbers, as well as students' higher expectations for on-campus living, residence halls now account for 18 percent of new construction on campuses—the second most popular construction project after classrooms. New residence halls go the extra mile to ensure student comfort; more than 92 percent of all residence halls completed since 2006 have included air conditioning. And advanced air filtration technologies are being installed to bring clean fresh air to dorm rooms.

Is residence hall construction and renovation focused on improving student comfort truly worth the investment? Research supports the trend: Two APPA reports have noted a distinct relationship between student satisfaction and choice of school and the condition of facilities.

The benefits of sustainability

Today, a green campus is practically a student expectation. A Princeton Review survey found that among 10,300 college applicants surveyed, 68 percent said that a college's commitment to the environment could affect their enrollment decision.³

Green schools, however, offer more than the environmental benefits that inspire green student activism. The U.S. Green Building Council defines a green school as “a school building or facility that creates a healthy environment that is conducive to learning while saving energy, resources and money.”⁴

In a survey conducted by Turner Construction Company, school executives reported a broad range of benefits to green schools. Compared to conventional schools, green schools were rated as performing “somewhat better” or “much better” in the following categories by a high percentage of the survey respondents:

Community image—87 percent Ability to attract and retain teachers—74 percent Reduced student absenteeism—72 percent Student performance—71 percent⁶



Research repeatedly links green schools to improvements in health, productivity and test scores—with an implied link to future earning power.⁵ Most of this research has been done within K-12 schools, but the basic findings that have linked building attributes including indoor air quality, lighting levels, air flow, temperature and humidity to K-12 student performance can logically be transferred to students attending colleges and universities.

Select knowledgeable partners

Campus administrators and facility directors cannot be experts in every aspect of a high performance facility that produces a premier educational environment.

Often one of the biggest knowledge gaps among on-campus staff is in knowing how to leverage indoor climate control systems to advance the mission of higher education. But who can you call? The typical energy service company (ESCO) may help you find ways to save money on annual energy spend and operational costs, but a company that is an ESCO and OEM delivers significant first cost savings and brings an even higher level of professional expertise to the implementation and ongoing maintenance of HVAC and other critical building systems throughout your campus. As an ESCO/OEM company with nearly 100 years of experience leading the HVAC systems and controls industry, Trane provides professional expertise that can save you money and create optimum conditions for higher education learning.

Footnotes:

1. Building Research Labs, Bud Guest, 2002.
2. U.S. Department of Education, A Test of Leadership: Charting the Future of U.S. Higher Education.
3. U.S. Green Building Council.
4. U.S. Green Building Council, Green Schools 101, <http://www.greenschoolbuildings.org/g101.aspx> (accessed March 2011).
5. Gregory Kats, Greening of America's Schools: Costs and Benefits, a Capital E Report, October 2006.
6. Cited in the 2006 Kats study: 2005 Survey of Green Buildings," Turner Construction. Available at: <http://www.turnerconstruction.com/greenbuildings>.

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