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On the Cover:

The Florida Atlantic University Pine Jog Elementary Environmental Education Center, School District of Palm Beach County, West Palm Beach, Fla. (Rank #12)
 Architect: Zyscovich Architects
 Photographer: Moris Moreno

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Bonds Build Interest



There is no shortage of interest among education institutions looking to capitalize on the \$22 billion in tax credits available over the next two years through the Qualified School Construction Bond (QSCB) program, which is part of the American Recovery and Reinvestment Act signed into law in February.

The program is accelerating interest in facilities improvement, and spurring construction plans and proposals at education institutions nationwide. The money saved by schools through the use of the credits is substantial, and administrators are working diligently to ensure they get their piece of the QSCB-program pie. Some states are looking to pool resources to sell their allocations; at least one held a lottery to determine which districts will receive the tax credits.

California recently announced

the results of a lottery to determine which institutions would receive a share of more than \$700 million in QSCB tax credits, as more districts applied than credits were available. The state's 11 largest school districts already received \$582 million of the \$1.35 billion total the state was allocated for 2009. Even though the state is among the most adversely affected by the current economic climate, education construction remains a priority—and officials see the program as a way to jump start construction, stimulate the economy and create jobs.

Alabama, Tennessee and Virginia are looking to pool financing to sell QSCBs, hoping that economies of scale will enable them to reach the bond markets less expensively. Other states and institutions are going the more traditional route of identifying capital needs and preparing bond issues—using the savings their QSCB allocations will bring as a selling point.

In addition to QSCBs, billions of dollars are available for construction and school improvement via the State Fiscal Stabilization Fund; Energy Efficiency Grants; Build America Bonds; Qualified Energy Conservation Bonds; and more—enabling education institutions to fund much-needed facilities repair, renovation and improvement. ■

Joe Agron

jagron@asumag.com

WEB 101

Knowledge on demand

Did you miss the GREEN School & University Virtual Conference & Expo in June? If so, you still can get the insight and information provided by the industry's most prominent thought leaders in a series of one-hour sessions, including:

•**Maximizing Learning and Savings by Going Green:** Ken Sidebottom, Johnson Controls.

•**Greening Your School District—Capitalizing on Options and Opportunities:** Rachel Gutter and Emily Knupp, USGBC; and Alfred R. Sena and Martin Montano, Rio Rancho Public Schools, N.M.

•**How to Make the Stimulus Work for You:** Judy Marks, NCEF; and Jon Kuzmich, CHPS.

•**Green Cleaning: How to Turn Your Facilities Into Healthier, More Productive Environments:** Stephen Ashkin, The Green Cleaning Network; and Mark Bishop, Healthy Schools Campaign.

•**Defining the Green Campus—Buildings and Beyond:** Rachel Gutter, USGBC; and Carol Walker, University of Florida.

All of the sessions are available free at ASUmag.com/green_virtual_conference. For information on the 2010 expo, contact Joe Agron at jagron@asumag.com.





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INSIDE: GREEN/SUSTAINABILITY



California State University, San Bernardino. Photo courtesy of Lori Krueger/Cal State San Bernardino.

SWEAT ENERGY

California State University, San Bernardino, has installed 20 exercise machines at its Student Recreation and Fitness Center that generate energy as users walk or run.

Fitness center officials say in a university news release that a typical 30-minute workout can light a fluorescent light bulb for about 2½ hours, or a laptop or desktop computer for 30 minutes.

"Each machine generates about 100 watts of power per hour," says Fitness Center director Rick Craig. "It's not much when you compare to the power usage, but the generated electricity goes straight back to our building to be used."

The only sign that the exercise machines are generating energy comes from a black power strip along the front of the 20 machines. The strip is connected to a small transformer installed into a nearby breaker panel. The transformer gives readings of the generated electricity.

Craig says the cost of the equipment is about \$14,000 and was paid for through student users' fees.

SCIENCE FACILITY GETS LEED GOLD

The Science and Engineering Building at the University of Colorado at Colorado Springs has received LEED gold certification from the U.S. Green Building Council.

The \$56.1 million, 159,000-square-foot building, which opened last month for classes, is the largest facility on the campus. Its environmentally friendly features include thin-film solar panels, a heating system that recovers exhaust from laboratories, an ice-storage system that saves air-conditioning costs, high-efficiency windows,

energy-efficient lighting with occupancy sensors, water-saving fixtures, and extensive use of low-chemical paints, adhesives, sealant, carpet and wood products.

University officials say the building is designed to be one-third more energy efficient than a comparable facility.

The building also includes a K-12 center with imagination stations and computer kiosks to assist teachers and to encourage elementary, middle and high school students to consider science and technical study.

ENERGY STARS IN CHARLOTTESVILLE, VA.

Five elementary schools in the Charlottesville (Va.) district have earned Energy Star designation from the U.S. Environmental Protection Agency.

Staff from the school district and the city's public works department have collaborated to make school facilities more energy efficient. They have installed more efficient lighting, upgraded heating and cooling systems, installed low-flow

and automatic flush valves, and monitored utility usage.

Commercial buildings that earn the Energy Star use an average of 40 percent less energy than typical buildings and also release 35 percent less carbon dioxide into the atmosphere. The system, which requires a rating of 75 or above, compares a building's energy consumption with similar buildings nationwide. ■

COOL CAMPUSES

The Sierra Club has compiled its list of "cool schools"—the college campuses with the greatest commitment to sustainability. The environmental organization surveyed higher-education institutions in eight categories: efficiency, energy, food, academics, purchasing, transportation, waste management and administration. The results were published in the September/October 2009 issue of *Sierra* magazine.

School	Score
University of Colorado at Boulder	100
University of Washington at Seattle	98
Middlebury College, Middlebury, Vt.	98
University of Vermont, Burlington	97
College of the Atlantic, Bar Harbor, Maine	97
Evergreen State College, Olympia, Wash.	96.5
University of California at Santa Cruz	96
University of California at Berkeley	96
University of California at Los Angeles	96
Oberlin College, Oberlin, Ohio	95

Maintenance

Despite budget constraints, custodial staffs shouldn't ease up on cleaning standards.



due to funding limitations, insufficient numbers of maintenance staff, or inadequate training of staff.”

The department recommends that schools have at minimum one custodian per 25,000 square feet of space. That ratio should be viewed as “the lower end for minimally adequate cleaning” and does not take into account the types of rooms and floor coverings.

“The amount of cleaning needed for a room depends on: the type of flooring; the number of hours it is used; the number of students; the amount of dust-collecting furnishings, materials, and clutter; and the presence of plants, animals, and activities,” the department says.

The paper notes that facilities management companies and professional associations recommend staffing guidelines of between 10,000 and 25,000 square feet per full-time custodian.

The health department recommends that school maintenance staffs carry out the following steps to improve their indoor environmental quality:

- Floors should be cleaned daily, including all exposed surface areas.

- Food-prep areas, tabletops, desktops, door handles and other frequent contact surfaces should be cleaned frequently, preferably daily.

- Other surfaces—furniture, shelves, cupboard tops, window ledges, ventilation diffusers, storage areas—should also be cleaned periodically.

- Custodians should use a microfiber cloth and HEPA filter vacuum for cleaning hard surfaces and carpet.

- When replacing curtains and horizontal blinds, consider non-fleecy vertical blinds; if curtains must be used, use synthetic rather than natural fabrics.

- Materials that can't be laundered should be dry cleaned, vacuumed or placed in a dryer on hot air or replaced with items that can be laundered.

Other staff members can help ease the burden on custodial workers:

- Teachers should minimize clutter.

- Staff should minimize fleecy items on display, such as stuffed toys, decorative items and hanging items. Fleecy toys that are routinely handled can collect skin cells, which are a primary food source for dust mites.

- Second-hand furniture should not be permitted; these can be loaded with pet allergens and mold spores.

- Students and staff can help custodians with cleaning by placing chairs on tables or stacking and placing trash cans in the hallway for pickup.

- Eating in classrooms should be minimized, and teachers should clean food debris on surfaces.

- Teachers should maintain animal habitats and properly care for plants. ■

—Mike Kennedy

Having properly cleaned and maintained facilities is a goal for every school and university, but achieving those high standards is becoming an insurmountable obstacle for custodial staffs decimated by budget constraints.

In a research paper compiled by the Minnesota Department of Health, “Cleaning, Indoor Environmental Quality and Health: A Review of the Scientific Literature,” the department notes the difficulty that education institutions in the state are having abiding by the standards they have set.

“Virtually every district that the Minnesota Department of Health has worked with in the past several years has reported cutting their maintenance budgets, including the numbers of custodians,” the department says. “Although many districts have good written cleaning guidelines, typically these guidelines are not implemented

NOTABLE

1 The recommended number of custodians per 25,000 square feet as a minimal staffing standard for schools.

Source: Minnesota Department of Health, “Cleaning, Indoor Environmental Quality and Health: A Review of the Scientific Literature”

CONSTRUCTION ZONE

RECREATION FACILITIES

Eco-friendly athletics

The University of Florida, Gainesville, has a new eco-friendly, highly sustainable, athletic-focused, Gator recruiting magnet: the Heavener Football Complex. It also is the first LEED platinum building in Florida.

The \$28 million complex includes offices, conferences rooms, locker and exhibit space in support of the Gators football program. As fans enter the facility, they walk into a two-story atrium with trophy cases and high-definition televisions. To the left of the atrium is the 4,000-square-foot Gator Room, a central area to host recruiting functions.

The facility's energy-saving features exceed state and national standards requirements by 35 percent, and include low-e glazing on glass, insulation and reflective materials that make the heating and air-conditioning systems more efficient.

Architect for the project is RDG Planning & Design (Des Moines).



University of Florida, Heavener Football Complex, Gainesville. Photo courtesy of Kun Zhang/Dimension Images



Fieldston Middle School, Bronx, N.Y. Photo courtesy of Robert Benson

Athletic expansion

Recently, the board of trustees of the Ethical Culture Fieldston School, Bronx, N.Y., determined that the school should expand its facilities to support the school's mission.

Part of the three-building middle school project is a 38,200-square-foot building housing a 126-foot by 156-foot athletic gym. The lower level has offices, restrooms, showers and lockers; it also contains classrooms, a trainer's room and a weightroom that feature open glass walls with views over the existing athletic fields. The main gym area features a full-court/half-court configuration option, rollup bleachers for up to 628 spectators and high, well-lighted ceilings.

A 13,900-square-foot building houses a six-lane, 75-foot-long pool with adjacent viewing bleachers. State-of-the-art features include a timing system with touch pads for accurate time

recording, and a unique method of using the HVAC system to heat the pool water. Additional facilities include locker rooms and offices.

A new terrace linking the gym and pool facilities would have eliminated four large oak trees, but the project team developed a solution that saved the trees and created a more unique design element. Water-conserving plumbing was used in both buildings. For its many green features, the school received LEED silver certification.

Architect for the project is Cooper, Robertson & Partners (New York City); Tishman Construction Corporation (New York City) is construction manager.

Client: Ethical Culture Fieldston School
Area: 38,200 sq. ft. (gymnasium); 13,900 sq. ft. (pool)
LEED rating: Silver

Aquatic excellence

The University of Tennessee, Knoxville, Allan Jones Intercollegiate Aquatic Center gives the Volunteers' swimming, diving and water-polo programs a premier aquatic facility. The center opened in August 2008 and includes an eight-lane, 50-meter by 25-yard competition pool, as well as a separate competition diving well featuring five platforms and six springboards.

The 72,000-square-foot structure provides permanent seating for 1,800 and space for another 2,000 on the pool deck. The \$24.3 million project also includes training facilities, a conference room, locker rooms, offices, a multipurpose room and elevated timing booth.

University officials expect the structure to help attract top swimming and diving recruits, and to host premier aquatic events.

HNTB (Kansas City, Mo.) was design architect for the facility. Associate architect is Lindsay & Maples Architects, Inc. (Knoxville, Tenn.) ■



University of Tennessee, Allan Jones Intercollegiate Aquatic Center, Knoxville.

Photo ©Feinknopf Photography, 2009, courtesy HNTB

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P.S. 58 Carroll School, New York City Schools (Rank #1); Architect: loci architecture pc; Mural: Derek Stenberg. Photo courtesy of John Bartelstone

THE AS&U

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Enrollment numbers stagnate or decline in most of the nation's largest school districts, while the largest colleges get bigger.

BY MIKE KENNEDY

Maybe it's a reflection of an inevitable slowdown of the birth rate. Maybe it's because of the ailing economy. Or maybe it's because of an exodus of students to charter schools. Whatever the reason, the numbers are clear: Student enrollment among the nation's largest school districts has begun to wane.

The AS&U 100, a compilation of enrollment data and other information for the 100 school districts with the most students, shows that 21 of the 27 largest districts experienced an enrollment decline from 2006-07 to 2007-08. The 27 districts that had more than 100,000 students in 2006-07 experienced a collective decline of more than 58,000 students—from 6,102,933 to 6,044,268.

Having fewer students means less funding for school systems, most of which receive state aid on a per-student basis. If an enrollment decline becomes prolonged, administrators sooner or later will have to cope with empty or underutilized facilities. That's been the situation for several years in Detroit Public Schools, which absorbed the most severe enrollment decrease in 2007-08. It reported an enrollment of 102,494, a drop of 12.85 percent from the 117,609 reported in 2006-07. Compared with numbers from 20 years earlier, Detroit's enrollment has dropped more than 43 percent—with some 79,000 fewer students, that means a lot of empty classrooms.

Detroit school officials recently announced plans for a \$500 million bond

election in November that would pay for improvements to many existing facilities, but the plan also could lead to the closing of 60 schools—in addition to the many that already have been shuttered.

The Washington, D.C., school system reported the steepest one-year enrollment decline—from 56,943 in 2006-07 to 49,422 in 2007-08. Much of that drop can be attributed to a change in the way the school system reports enrollment—the 2006-07 numbers included many charter schools, but those numbers now are compiled separately from the Washington, D.C., system.

A decline in enrollment is a new phenomenon for many of these districts. Of the 100 largest districts in 2007-08, only eight reported overall enrollment declines from 1987 to 1997. In aggregate, the 100 largest districts in 2007-08 grew more than 30 percent from 1987 to 2007—from 8,194,951 students to 10,708,738. From 1997 to 2007, 31 of the districts saw their overall enrollment drop. And from 2006-07 to 2007-08, 55 of the 100 largest districts reported fewer students.

Some districts defied the odds and continued to add students. Three of the top 100 districts experienced one-year enrollment growth of 5 percent or greater: Loudoun County, Va., (75th largest) added more than 3,600 students and grew 7.15 percent to 53,985 students. Douglas County, Colo., (81st largest) grew 5.19 percent, from 50,370 to 52,983. Katy, Texas, (76th largest) grew 5 percent, from 51,201 to 53,762. Those districts also are the ones that have had the steepest growth rate over 20 years. Douglas

County has grown more than 404 percent since 1987, when it had 10,501 students. Loudoun County has grown 349 percent since its 1987 enrollment of 12,011; and Katy is 237 percent larger than 1987, when it had 15,952 students.

The school systems whose enrollment numbers have declined most precipitously over 20 years (in addition to Detroit) are Washington, D.C. (42.82 percent), Cleveland (31.06 percent), Baltimore (26.23 percent) and Atlanta (24.94 percent).

The drop in student numbers that has begun at the largest K-12 institutions is not showing up in the enrollment figures for colleges and universities. All but one of the 20 colleges with the largest enrollments gained students from fall 2006 to fall 2007, and all 20 report higher enrollments compared with fall 1997. The higher-education institution with the largest enrollment is the University of Phoenix. As an online operation not constrained by limited classroom space, it enrolled more than 224,000 students in fall 2007.

Enrollment data for 2007-08 comes from states or individual districts/institutions. Data from earlier years comes from the U.S. Department of Education's National Center for Education Statistics. Because states and local districts/institutions do not always calculate enrollment the same way federal number-crunchers do, the numbers shown here for 2007-08 may not match the NCES figures when they are released. ■

Kennedy can be reached at mkenedy@asumag.com.

CONTINUED...

RANK	SCHOOL DISTRICT	STATE	ENROLLMENT 2007-08	ENROLLMENT 2006-07	'06 TO '07 % CHANGE	'06-'07 PPE*	ENROLLMENT 1997-98	'97 TO '07 % CHANGE	ENROLLMENT 1987-88	'87 TO '97 % CHANGE	'87 TO '07 % CHANGE
1	New York City	NY	1,035,406	1,042,478	-0.68%	\$16,443	1,071,853	-3.40%	939,933	14.04%	10.16%
2	Los Angeles	CA	693,680	707,627	-1.97%	\$10,364	680,430	1.95%	589,311	15.46%	17.71%
3	Chicago	IL	407,510	413,694	-1.49%	\$9,666	477,610	-14.68%	419,537	13.84%	-2.87%
4	Miami	FL	348,113	353,790	-1.60%	\$9,371	345,958	0.62%	253,720	36.35%	37.20%
5	Clark County	NV	312,546	303,448	3.00%	\$7,791	190,822	63.79%	100,027	90.77%	212.46%
6	Broward County	FL	258,895	262,813	-1.49%	\$8,620	224,799	15.17%	137,366	63.65%	88.47%
7	Houston	TX	198,769	202,936	-2.05%	\$7,994	210,988	-5.79%	191,708	10.06%	3.68%
8	Hillsborough County	FL	193,116	193,517	-0.21%	\$7,781	152,781	26.40%	118,171	29.29%	63.42%
9	Hawaii	HI	178,369	180,728	-1.31%	\$11,060	189,887	-6.07%	166,160	14.28%	7.35%
10	Orange County	FL	174,136	175,245	-0.63%	\$8,116	133,826	30.12%	88,878	50.57%	95.93%
11	Philadelphia	PA	172,704	178,241	-3.11%	\$8,985	212,865	-18.87%	194,698	9.33%	-11.30%
12	Palm Beach County	FL	170,844	171,431	-0.34%	\$8,937	142,724	19.70%	89,944	58.68%	89.94%
13	Fairfax County	VA	165,734	163,952	1.09%	\$12,716	145,722	13.73%	112,599	29.42%	47.19%
14	Dallas	TX	157,605	159,144	-0.97%	\$8,416	157,622	-0.01%	130,885	20.43%	20.41%
15	Gwinnett County	GA	154,901	152,043	1.88%	\$8,851	93,509	65.65%	54,754	70.78%	182.90%
16	Montgomery County	MD	137,717	137,814	-0.07%	\$13,938	125,023	10.15%	96,271	29.87%	43.05%
17	Wake County	NC	133,831	128,748	3.95%	\$7,728	89,772	49.08%	59,687	50.40%	124.22%
18	Charlotte-Mecklenburg	NC	131,897	128,789	2.41%	\$8,081	95,795	37.69%	74,680	28.27%	76.62%
19	San Diego	CA	131,577	130,983	0.45%	\$9,682	136,283	-3.45%	116,557	16.92%	12.89%
20	Prince George's County	MD	129,752	131,014	-0.96%	\$11,526	128,347	1.09%	104,412	22.92%	24.27%
21	Duval County	FL	124,775	125,176	-0.32%	\$8,395	126,979	-1.74%	105,049	20.88%	18.78%
22	Memphis	TN	113,466	117,349	-3.31%	\$8,229	111,227	2.01%	107,345	3.62%	5.70%
23	Pinellas County	FL	107,895	109,915	-1.84%	\$8,656	109,309	-1.29%	88,866	23.00%	21.41%
24	Cobb County	GA	106,673	107,274	-0.56%	\$8,809	88,266	20.85%	64,172	37.55%	66.23%
25	Baltimore County	MD	104,283	105,839	-1.47%	\$11,307	104,708	-0.41%	81,152	29.03%	28.50%
26	Detroit	MI	102,494	117,609	-12.85%	\$11,896	174,730	-41.34%	181,583	-3.77%	-43.56%
27	DeKalb County	GA	97,580	101,396	-3.76%	\$10,073	91,864	6.22%	73,865	24.37%	32.11%
28	Jefferson County	KY	97,412	92,659	5.13%	\$9,698	104,338	-6.64%	93,198	11.95%	4.52%
29	Cypress-Fairbanks	TX	96,546	92,135	4.79%	\$6,767	55,593	73.67%	34,073	63.16%	183.35%
30	Albuquerque	NM	95,965	95,493	0.49%	\$9,787	87,274	9.96%	82,416	5.89%	16.44%
31	Polk County	FL	94,164	92,801	1.47%	\$8,380	76,497	23.10%	61,391	24.61%	53.38%
32	Long Beach	CA	88,186	90,663	-2.73%	\$8,753	85,908	2.65%	66,253	29.67%	33.10%
33	Milwaukee	WI	86,819	89,912	-3.44%	\$11,725	101,253	-14.26%	91,658	10.47%	-5.28%
34	Jefferson County	CO	86,182	86,154	0.03%	\$8,202	88,006	-2.07%	75,337	16.82%	14.40%
35	Northside (San Antonio)	TX	85,544	82,587	3.58%	\$7,310	60,083	42.38%	46,822	28.32%	82.70%
36	Fulton County	GA	84,337	83,861	0.57%	\$9,406	62,798	34.30%	40,154	56.39%	110.03%
37	Austin	TX	82,181	82,140	0.05%	\$8,182	76,606	7.28%	61,402	24.76%	33.84%
38	Baltimore City	MD	81,284	84,515	-3.82%	\$12,440	107,416	-24.33%	110,189	-2.52%	-26.23%
39	Lee County	FL	80,541	78,981	1.98%	\$8,319	53,790	49.73%	37,708	42.65%	113.59%

* Per-pupil expenditures

Underestimating What's Overhead

Reversing the Trend of Deferred Roof Maintenance

Many outside the M&O department do not realize just how important roofs are to school buildings. As a shield of protection around everything within the building, including students and staff, proper roof care is vital. Performing and tracking timely, proactive maintenance is key to saving your budget from unexpected major capital expense and ensuring your roofs meet their expected service life.

Lack of Foresight

Although the average life expectancy for roofs is 10-14 years, with a warranty of 10-30 years, many roofs do not last that long due to the lack of assertive maintenance programs. Whether using outside contractors or in-house crews, many departments ignore small preventive steps that should be taken to keep problems from escalating.

Implementing reactive, short-term solutions instead wastes time and resources on quick fixes that will constantly demand further repair. This leads to costly replacement repairs, which makes for an unstable educational environment and even bigger budget woes.

Break the Cycle

In order to break this cycle and extend asset life, many school districts use Internet-based tools to schedule and track maintenance-related activities. Facility professionals track roof maintenance work in progress and can keep a historical record of all maintenance associated with their roofs.

Regular inspections to protect the roof, and everything it covers, are a must. Roofs should be inspected at least twice per year, as well as after major storms. Roof audits should include tracking specific data on separate sections of a roof. This may allow portions of the roof to be replaced in stages, rather than renovating the entire roof at once.

To extend the life of roofs, roofing inspectors can help capture the desired data and necessary tasks during regular inspections. Completing roofing action items, whether recurring or reactive, is vital, but sometimes they are "lost" if not captured in a way that reminds maintenance personnel that tasks are due for completion.

Optimum Environment

Software solutions from SchoolDude.com allow M&O departments to easily organize their roofing maintenance tasks and actions, whether reactive work orders or preventive maintenance. Because they are web-based, users can access the tools from any computer with Internet capability.

Tracking requests using SchoolDude's maintenance and preventive maintenance management systems offers the flexibility for third-party contractors, such as Tremco, to further assist facilities departments by entering preventive maintenance activities and inspection reports into the system themselves, further streamlining the process. Leveraging this type of partnership allows maintenance departments to run at the highest efficiency possible, freeing facility personnel to concentrate on other important tasks critical to maintaining a quality educational environment.

Tools to Help

SchoolDude is helping more than 3,000 school districts manage regular roof inspection and maintenance, ultimately improving efficiency and reducing losses. With MaintenanceDirect, SchoolDude's work management tool, work orders are automatically routed, and reports can easily

*Completing
roofing action items,
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that reminds
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tasks are due for completion.*

be generated. PMDirect allows recurring preventive maintenance tasks to be created, assigned and managed efficiently. PM work orders can be run daily, weekly, monthly, annually, or on an equipment usage basis and are automatically generated through integration with MaintenanceDirect.

Streamlining these processes to maintain a school's largest asset allows roof maintenance to develop into the priority it should become and command the importance it deserves.

For more information on how SchoolDude can help you, call Erin Tucker at 1-877-868-3833 or email erin@schooldude.com.

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RANK	SCHOOL DISTRICT	STATE	ENROLLMENT 2007-08	ENROLLMENT 2006-07	'06 TO '07 % CHANGE	'06-'07 PPE*	ENROLLMENT 1997-98	'97 TO '07 % CHANGE	ENROLLMENT 1987-88	'87 TO '97 % CHANGE	'87 TO '07 % CHANGE
40	Jordan	UT	80,187	78,299	2.41%	\$5,111	73,181	9.57%	61,230	19.52%	30.96%
41	Fort Worth	TX	78,732	79,457	-0.91%	\$7,715	76,901	2.38%	67,191	14.45%	17.18%
42	Fresno	CA	76,460	77,555	-1.41%	\$8,995	78,166	-2.18%	61,539	27.02%	24.25%
43	Brevard County	FL	74,371	74,785	-0.55%	\$8,120	67,879	9.56%	49,510	37.10%	50.21%
44	Anne Arundel County	MD	73,400	73,066	0.46%	\$11,149	73,363	0.05%	64,432	13.86%	13.92%
45	Nashville	TN	73,077	73,731	-0.89%	\$8,561	67,558	8.17%	67,538	0.03%	8.20%
46	Denver	CO	73,053	72,561	0.68%	\$9,063	67,858	7.66%	59,439	14.16%	22.90%
47	Prince William County	VA	72,989	70,948	2.88%	\$10,020	49,905	46.26%	34,960	42.75%	108.78%
48	Mesa	AZ	72,604	74,128	-2.06%	\$6,908	69,764	4.07%	59,367	17.51%	22.30%
49	Virginia Beach	VA	72,477	72,538	-0.08%	\$10,123	77,521	-6.51%	58,763	31.92%	23.34%
50	Guilford County	NC	71,220	71,722	-0.70%	\$8,297	59,903	18.89%	23,984	149.76%	196.95%
51	Greenville	SC	69,443	67,537	2.82%	\$7,571	56,967	21.90%	50,886	11.95%	36.47%
52	Granite	UT	67,948	67,502	0.66%	\$5,486	74,956	-9.35%	73,312	2.24%	-7.32%
53	Fort Bend	TX	67,780	67,014	1.14%	\$7,063	49,093	38.06%	28,738	70.83%	135.85%
54	Pasco County	FL	66,313	64,689	2.51%	\$7,940	44,770	48.12%	30,305	47.73%	118.82%
55	Washoe County	NV	65,677	64,954	1.11%	\$7,781	51,205	28.26%	34,538	48.26%	90.16%
56	Seminole County	FL	65,355	66,351	-1.50%	\$7,885	56,916	14.83%	43,511	30.81%	50.20%
57	Volusia County	FL	64,570	65,867	-1.97%	\$8,422	59,310	8.87%	41,829	41.79%	54.37%
58	Davis	UT	64,551	62,193	3.79%	\$5,580	59,220	9.00%	49,684	19.19%	29.92%
59	Mobile	AL	63,424	65,097	-2.57%	\$8,396	65,230	-2.77%	67,619	-3.53%	-6.20%
60	Arlington	TX	62,560	63,082	-0.83%	\$7,140	54,591	14.60%	41,414	31.82%	51.06%
61	Elk Grove	CA	62,294	61,881	0.67%	\$7,943	40,197	54.97%	19,904	101.95%	212.97%
62	North East (San Antonio)	TX	61,910	61,255	1.07%	\$7,737	46,550	33.00%	38,688	20.32%	60.02%
63	El Paso	TX	61,839	62,857	-1.62%	\$7,796	63,909	-3.24%	61,800	3.41%	0.06%
64	Aldine	TX	59,822	58,831	1.68%	\$8,107	48,585	23.13%	37,657	29.02%	58.86%
65	Tucson	AZ	59,060	60,333	-2.11%	\$7,553	62,480	-5.47%	55,175	13.24%	7.04%
66	Chesterfield County	VA	58,969	58,455	0.88%	\$8,279	50,173	17.53%	36,056	39.15%	63.55%
67	Alpine	UT	58,665	56,460	3.91%	\$5,048	44,694	31.26%	36,005	24.13%	62.94%
68	Santa Ana	CA	57,061	57,286	-0.39%	\$9,329	53,805	6.05%	38,184	40.91%	49.44%
69	San Bernardino	CA	56,727	57,398	-1.17%	\$8,860	47,385	19.72%	35,033	35.26%	61.92%
70	Garland	TX	56,593	56,955	-0.64%	\$7,068	46,632	21.36%	34,603	34.76%	63.55%
71	Boston	MA	56,168	56,388	-0.39%	\$19,435	63,762	-11.91%	59,445	7.26%	-5.51%
72	San Francisco	CA	55,069	56,183	-1.98%	\$8,716	61,007	-9.73%	63,881	-4.50%	-13.79%
73	Knox County	TN	54,896	59,663	-7.99%	\$6,761	51,152	7.32%	50,533	1.22%	8.63%
74	San Antonio	TX	54,726	55,406	-1.23%	\$8,402	61,112	-10.45%	61,501	-0.63%	-11.02%
75	Loudoun County	VA	53,985	50,383	7.15%	\$12,234	23,616	128.60%	12,011	96.62%	349.46%
76	Katy	TX	53,762	51,201	5.00%	\$7,143	28,230	90.44%	15,952	76.97%	237.02%
77	Columbus	OH	52,894	56,003	-5.55%	\$11,895	64,872	-18.46%	65,562	-1.05%	-19.32%
78	Cumberland County	NC	52,777	53,621	-1.57%	\$7,609	51,014	3.46%	44,216	15.37%	19.36%
79	Osceola County	FL	52,742	52,012	1.40%	\$7,727	28,733	83.56%	14,448	98.87%	265.05%

* Per-pupil expenditures

RANK	SCHOOL DISTRICT	STATE	ENROLLMENT 2007-08	ENROLLMENT 2006-07	'06 TO '07 % CHANGE	'06-'07 PPE*	ENROLLMENT 1997-98	'97 TO '07 % CHANGE	ENROLLMENT 1987-88	'87 TO '97 % CHANGE	'87 TO '07 % CHANGE
80	Plano	TX	53,439	52,997	0.83%	\$7,749	43,323	23.35%	28,231	53.46%	89.29%
81	Douglas County	CO	52,983	50,370	5.19%	\$7,916	27,275	94.25%	10,501	159.74%	404.55%
82	Capistrano	CA	52,390	51,512	1.70%	\$7,613	40,174	30.41%	21,920	83.28%	139.01%
83	Clayton County	GA	52,029	52,533	-0.96%	\$8,349	42,684	21.89%	33,893	25.94%	53.51%
84	Corona-Norco	CA	51,322	49,865	2.92%	\$7,695	31,241	64.28%	18,296	70.75%	180.51%
85	Forsyth County	NC	51,255	51,325	-0.14%	\$8,436	42,294	21.19%	38,588	9.60%	32.83%
86	Cherry Creek	CO	50,631	49,684	1.91%	\$8,222	38,622	31.09%	26,739	44.44%	89.35%
87	Pasadena	TX	50,603	49,851	1.51%	\$7,203	40,895	23.74%	34,880	17.24%	45.08%
88	Cleveland	OH	50,078	55,593	-9.92%	\$11,383	76,504	-34.54%	72,639	5.32%	-31.06%
89	Howard County	MD	49,542	49,048	1.01%	\$12,507	40,215	23.19%	26,653	50.88%	85.88%
90	Lewisville	TX	49,449	49,060	0.79%	\$7,404	32,622	51.58%	17,712	84.18%	179.18%
91	Washington, D.C.	DC	49,422	56,943	-13.21%	\$14,324	77,111	-35.91%	86,435	-10.79%	-42.82%
92	Atlanta	GA	49,101	50,631	-3.02%	\$12,745	60,024	-18.20%	65,417	-8.24%	-24.94%
93	Anchorage	AK	48,857	49,230	-0.76%	\$10,466	48,888	-0.06%	40,941	19.41%	19.34%
94	Brownsville	TX	48,796	48,334	0.96%	\$8,277	40,324	21.01%	35,255	14.38%	38.41%
95	Garden Grove	CA	48,669	48,802	-0.27%	\$8,478	45,776	6.32%	36,289	26.14%	34.12%
96	Henrico County	VA	48,620	47,680	1.97%	\$8,161	39,073	24.43%	28,309	38.02%	71.75%
97	Wichita	KS	48,475	46,938	3.27%	\$9,788	46,859	3.45%	45,689	2.56%	6.10%
98	Sacramento	CA	48,446	49,355	-1.84%	\$9,396	51,042	-5.09%	46,064	10.81%	5.17%
99	Omaha	NE	47,652	47,044	1.29%	\$8,354	45,046	5.79%	41,416	8.76%	15.06%
100	San Juan	CA	47,400	47,862	-0.97%	\$8,648	47,837	-0.91%	46,710	2.41%	1.48%

* Per-pupil expenditures

LARGEST IN HIGHER EDUCATION

RANK	INSTITUTION	ENROLLMENT '07-'08	ENROLLMENT '06-'07	ENROLLMENT '97-'98
1	University of Phoenix-Online Campus	224,880	165,373	3,296
2	Miami Dade College	54,094	51,329	48,449
3	Ohio State University	52,568	51,818	48,278
4	University of Florida	51,725	50,912	41,713
5	Arizona State University	51,481	51,234	44,255
6	University of Minnesota-Twin Cities	50,883	50,402	45,410
7	The University of Texas at Austin	50,170	49,697	48,857
8	University of Central Florida	48,398	46,646	28,685
9	Texas A&M University	46,542	45,380	41,461
10	City College of San Francisco	46,411	44,392	28,165
11	Michigan State University	46,045	45,520	42,603
12	University of South Florida	44,870	43,636	34,036
13	Houston Community College System	43,518	42,526	38,463
14	Pennsylvania State University	43,252	42,914	40,538
15	University of Illinois at Urbana-Champaign	42,326	42,738	38,070
16	New York University	41,783	40,870	36,679
17	University of Wisconsin-Madison	41,563	41,028	39,699
18	Northern Virginia Community College	41,266	38,166	35,221
19	University of Michigan-Ann Arbor	41,042	40,025	36,995
20	Florida State University	40,555	39,973	30,401

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The use of properly maintained carpet can improve air quality by reducing the levels of airborne particles.

Health Wise

Improved indoor environmental quality and school maintenance can pay dividends in higher grades and healthier, happier students and staff.

By Jim Holland

Good indoor environmental quality (IEQ) is an important component for improving the productivity of students, teachers and support staff. It is crucial for a sense of health and well-being.

According to the National Center for Education Statistics (NCES),

almost 20 percent of the population of the United States spends a significant portion of the day in one of the nation's more than 120,000 public and private K-12 schools. About 55 million children occupy elementary and secondary schools, and another 6 million adults fill various teaching, administrative and support functions.

One factor that makes schools such an important focus for environmental improvements is that children are more sensitive than adults to exposure. As such, the overall indoor environmental quality has a significant influence on student attendance and performance. Studies have shown that poor indoor air quality results in more illness,



Typical asthma triggers include mold, dust mites, insect body parts and some chemicals.

absenteeism and asthma attacks. Because many schools receive funding based on daily attendance, any rise in illness and absenteeism can mean less funding.

A student whose asthma is not being controlled in school is distracted from learning, and an entire class can be affected when teachers must attend to the physical well-being of the child. Asthma-related problems are estimated to be responsible for 14.7 million missed school days every year and affect

one in 13 children of school age. Typical asthma triggers include mold, dust mites, insect body parts and some chemicals.

Old vs. new

To some it may seem that old school buildings are the biggest problem. A federal study found that in 1998, the average school building in the United States was 42 years old—with more than a quarter of these buildings having been built prior to



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1950. Older buildings, especially those that have been maintained poorly, can have environmental problems—but so can newer buildings. The selection, use and maintenance of building materials and furnishings also can affect the indoor environment.

In its publication “Mold Remediation in Schools and Commercial Buildings,” the U.S. Environmental Protection Agency says: “Some moisture problems in buildings have been linked to changes in building construction practices during the 1970s, 80s and 90s. Some of these changes have resulted in buildings that are tightly sealed, but may lack adequate ventilation, potentially leading to moisture buildup.”

Even occupants of new buildings can experience adverse effects from elevated levels of chemicals emitted from products used during construction or building maintenance. Those that do not react overtly still may suffer from a reduction in learning, because concentration and the ability to calculate and memorize suffer.

Making a plan

The indoor environmental quality of a school is essential for improving the educational setting. The EPA’s “Tools for Schools” helps increase awareness about the importance of indoor environmental quality. Using this voluntary program, various departments in education institutions can undergo a self-evaluation that identifies which environmental problems exist and how to address them.

Some improvements are as simple and inexpensive as scheduling certain maintenance activities at times when students and faculty aren’t present. Some work can be scheduled during the summer or over a weekend when an increased ventilation rate can help remove the off-gassing of volatile chemicals that can cause discomfort.

One example of the success of the EPA’s program is Little Harbour School in New Hampshire. Just five

months after beginning the program, the staff documented a 25 percent decrease in the number of times students visited the school nurse, along with an overall decrease in student absence and the incidence of bronchitis in the school staff. These results largely were achieved by making low-cost changes such as improving the ventilation, switching to low-VOC cleaning products and changing the timing of maintenance activities.

Carpet’s role

Indoor carpeting has been cited as presenting problems for indoor environmental quality—but further research indicates the way the carpet is maintained is more of a factor than its presence or absence. One blind study of office workers used a soiled 20-year-old carpet on a concealed rack that could be wheeled in

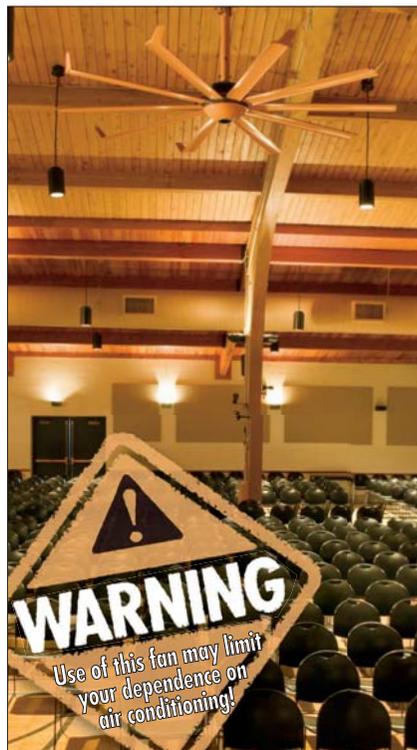
NOTABLE

35 In millions, number of people in the United States affected by seasonal allergies.

Source: American Academy of Allergy, Asthma and Immunology.

and out of a room without occupants being aware of its presence. This study demonstrated that occupants suffered more headaches and a 2 to 6 percent decrease in motor skills, memory, mathematics and logic when the concealed carpet was present. Increasing the ventilation rate of the air-handling system resulted in a significant improvement in occupant performance. (Wargoeki 1999, 2000)

On the other hand, studies conducted by the Carpet and Rug Institute have shown that the use of



Side effects may include: an improved style profile, more comfortable students, and the repeated sound of “WOW!”

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properly maintained carpet improves air quality by reducing the levels of airborne particles. The Burlington (Vt.) School District made a number of changes, including the purchase of high-efficiency vacuum cleaners with HEPA filters for use during the routine maintenance of its carpets. Within the first year of carrying out this change, the annual absentee rate among asthmatic students dropped from an average of 31 days to just

two days.

Various organizations have made recommendations to help schools select, install and maintain carpeting. The Carpet and Rug Institute recommends purchasing carpeting that complies with its Green Label Plus program. To qualify, new carpets must meet specifications for low VOC emissions.

Health Canada has recommended evaluating carpet before it is pur-

chased to be sure it can be maintained and cleaned easily. The group suggests airing out new carpet before it is installed and using low-VOC adhesives when it is glued to the floor. It also suggests replacing carpet when school is out and that "extra exhaust ventilation should continue for a minimum of 72 hours after installation." Furthermore, carpet shouldn't be installed "near water fountains, sinks, showers, pools or other locations where it may get wet." If carpet does get wet "extract the moisture and be sure the carpet is dry within 24 hours."

The Institute of Inspection, Cleaning and Restoration Certification (IICRC) has published a "Standard and Reference Guide for Professional Carpet Cleaning (S100)." An updated edition of the standard is scheduled for publication this year. This standard describes the procedures, methods and systems to be followed when performing professional commercial and residential textile floor covering (carpet and rugs) maintenance and cleaning. Providing well-maintained carpet contributes to improved indoor environmental quality. ■

Holland, REA, CR, WLS, is president of RestCon Environmental, Sacramento, Calif., a division of Restoration Consultants, Inc. He has been in the cleaning and restoration industry for more than 35 years and can be reached at (916)736-1100.

WEB 101

For more articles on carpet and flooring maintenance, as well as IEQ, visit the article archives at ASUmag.com.

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Part of Lake Land College's, Mattoon, Ill., energy-saving efforts included efficient lighting installed in the gymnasium.

Good Performers

Budget-neutral solutions can create greener, more healthful schools.

By Bob Bennett

Soaring energy prices and tightening school budgets don't mix well. In fact, millions of children across the United States are being educated in energy-leaking, unhealthy facilities in dire need of

physical upgrade and systems modernization.

But how can an education institution pay for the work—especially in today's trying economic times? A related question: Do schools in aged facilities have cost-effective options to

heighten energy efficiency and make environmentally friendly decisions?

Increasing numbers of K-12 districts and institutions of higher learning are turning to performance-based contracting to address these issues effectively. It's a "budget-neutral"

method of contracting that enables a building owner to pay for facility upgrades via the cost savings that are guaranteed to be achieved by making those improvements.

It's also an investment in academic performance because renovations often create a more healthful and comfortable classroom setting. Fewer teachers and students are out sick because of asthma and other illnesses aggravated by poor indoor air quality and inconsistent temperatures.

Within reach

Performance-based contracting is a perfect fit for projects designed to cut energy use or modernize building systems. Prime examples include mechanical-system upgrades, building automation, lighting retrofits, sealing a building's envelope and water/sewer system replacements. It eliminates the need for major upfront capital investment by financing improvements over a number of years. Because the energy or operating cost savings attained each year equals or exceeds the annual

financing cost, the project becomes self-funding.

School administrators are drawn to this funding strategy especially on projects that combine installing Web-based building-automation systems and sealing the building envelope.

Advanced automation enables a facility's service infrastructure, such as mechanical and lighting systems, to be monitored and controlled off-site via the Internet. The systems can adjust lighting levels, air temperature and circulation to unerringly achieve the optimal balance between energy use and comfort.

Building automation systems can schedule regular maintenance and automatically diagnose a problem, then generate a work order to repair the glitch. The technology also can integrate other essential systems, such as security, access control and real-time utility-metering, into the system. Meanwhile, the comparatively mundane process of sealing energy leaks by installing energy-efficient windows, insulation, weather stripping and roofing enables these sophisticated systems to optimize energy-use results.

Performance-based contracting also is a pragmatic way to pay for the design and installation of Earth-friendly "green" technologies. Geothermal, wind and solar systems collect clean, renewable energy from the Earth, wind and sun, and produce significant energy savings while reducing carbon footprints.

Even in a credit-constricted economy, projects premised on a performance-based contract are comparatively easy to finance. The reason: Because it is possible to accurately project future reductions in energy use, the accompanying cost savings can be forecast conservatively. And, those savings flow directly to the bottom line. In essence, money already in a school's operating budget pays for the future improvements. Financing sources are abundant. Typically, contractors can refer administrators to financial institutions willing to

NOTABLE

7 to 10 The typical term of an energy performance contract.

Source: www.energyservicescoalition.org

underwrite such projects. Experienced contractors also can help institutions prepare grant applications or build the factual case in support of efforts to pass a bond issue.

What to expect

How can school officials tell when a facility is a good candidate for funding through a performance-based contract?

- Year-to-year comparative energy-use analysis that shows growing inefficiency.
- Shockingly high utility bills whenever energy prices spike.
- Annual building operations budget increasingly overburdened.
- Mechanical, electrical, plumbing and lighting systems nearing the end of their useful life.
- Building systems that break down frequently.
- Conditioned environment with "hot spots" and "cold spots."
- Occupant complaints about physical discomfort or safety.
- Maintenance staff without the time or expertise to maintain systems properly.
- A district or higher-education institution that has set a carbon-reduction goal.

The process begins with an assessment conducted by a LEED-accredited professional. The comprehensive

Verification: The big payoff

The most satisfying aspect of a performance-based contract comes one year after project completion when the contractor returns to a school to measure and monetize the energy-saving performance of the work.

An updated building automation system and mechanical-system operating improvements at Central High School, Cape Girardeau, Mo., delivered \$73,403 in first-year energy savings—more than three times the estimated \$23,974.

Marshall School District, Marshall, Mo., reached \$132,088 in first-year savings—almost \$27,000 more than projected—thanks to HVAC and lighting retrofits paired with electrical upgrades and building automation at seven district facilities.

WEB 101

For more tips on shaving your energy bills, visit the Energy & Indoor Environment article archives at ASUmag.com.

appraisal evaluates the efficiency and life-cycle costs of building infrastructure, including climate control, (boilers, chillers, piping ventilation and mechanical equipment), building envelope (windows, insulation, doors, roofs and weather stripping), lighting, life safety (fire and security), water and sewer.

The facility assessment enables the contractor to project future energy savings based on the industry-accepted guidelines of the International Performance Measurement and Verification Protocol (IPMVP). It uses current and best-practice techniques available for measurement, projection and verification of energy use.

Engineers and developers then craft a solution that addresses the school's needs and fits its budget. Customer expectations, total cost and scheduling are finalized before any construction begins.

Typically, work is completed on a turnkey basis, with the contractor serving as the single-source authority as the project progresses. The contractor hires and manages all subcontractors, oversees all aspects of construction through completion and communicates one on one with school officials. Work usually is completed over summer break to avoid disrupting students.

When construction is complete, the contractor will make certain that all new mechanical equipment is integrated and commissioned fully, verify that systems are running at peak efficiency and train maintenance staff in ongoing operation.

Beyond energy savings

Research shows that children perform better academically in clean, well-circulated and naturally lighted environments. According to a report issued by the National Clearinghouse for Educational Facilities in 2002, poor indoor air quality affects 20 percent of the U.S. K-12 student population, and American children miss millions of school days each year because of asthma problems made worse by inadequate air circulation.

In addition to air quality, room temperature and lighting also play a key role in student learning. The optimal learning temperature is between 65°F and 74°F, and some studies show that children progress as much as 26 percent faster in math and reading in spaces with appropriately designed natural lighting.

Shrinking school budgets no longer are an excuse to delay building improvements. Budget-neutral, performance-based contracting gives education institutions the ability to upgrade facilities, save money, enhance the learning environment and reduce carbon output without breaking the bank. And, perhaps best of all, the savings are guaranteed. ■

Bennett is managing partner of Control Technology and Solutions (CTS), a St. Louis-based company that provides design and construction services that improve energy efficiency. He can be reached at (636)230-0843 or rbennett@thectsgroup.com.



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Technology is changing constantly and is a critical component of education management.

Paper Trail

Helping schools become efficient through software innovations.

By John P. Weidenhammer

Education institutions have become increasingly aware of ways to save energy, protect the environment and reduce their carbon footprint. Moreover, the U.S. Green Building Council, a non-profit organization dedicated

to sustainable building design and construction, has witnessed a huge increase in the number of schools interested in going green. Lighting a classroom, shipping and creating products, fueling buses and photocopying paper all contribute to a school's carbon footprint.

Many schools are committing to use technology to help them create a "paperless office." New administrative software can significantly reduce a school's carbon footprint. A paperless office is environmentally friendly, saves time and money, and improves day-to-day efficiency.

Where to start

By working smarter to make computers work harder, an education institution can significantly reduce the amount of paper it uses. The average school would save about 5,000 sheets of paper (or one box at about \$45) per user each year. Maximizing the use of an administrative software program can help eliminate paper, storage, postage, ink and numerous other supplies.

To begin the process, start analyzing the efficiencies that finance-management software can deliver. Many applications can automate a number of manual administrative processes and eliminate redundancies in staff responsibilities. Software often is customizable to meet specific report requirements and create user-specific security access. Look for capabilities

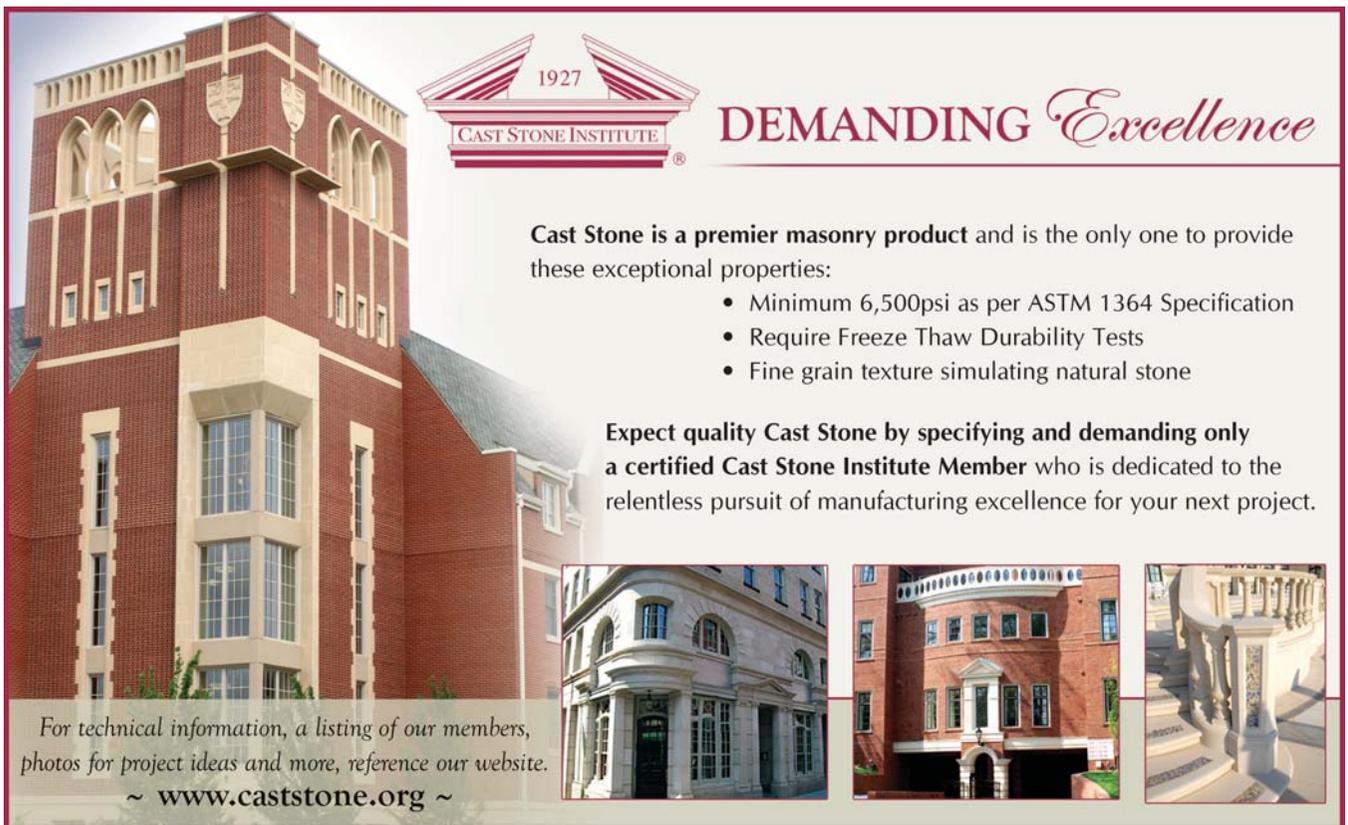
that enable users to budget, monitor and control finances effectively. Search for software with a range of features such as managing grant reporting, controlling the creation of financial reports, and creating a budget from requisitions.

By working on only one database for finance, payroll and personnel, human resources can be accomplished quickly and seamlessly. Look for user-profile records that enable the system to be tailored to a school's specific requirements. Features such as multiple payroll cycles for regular, recurring and one-time additional pay components can process salaried and unit-paid employees in a single payroll run. Automatic leave accrual and attendance tracking is another great feature that monitors absence trends for employees.

Using software that incorporates

accounting, budgeting and payroll eliminates redundant input. Look for features such as auditing trails of all transactions, comprehensive reporting capabilities, budget-creation tools, and the ability to process W-2s and 1099s. Handling such sensitive information, a software application should have security capabilities that enable users' access to be dictated by their logon information. In turn, staff members can gain access to only the applications, menus, programs and functions appropriate for their position.

Converting documents into PDF files is another way to initiate the paperless process. Start by scanning files from accounting, finance and human resources. Scanned images and PDFs then can be stored in the software's database and attached to specific records. E-mailing electronic





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PDFs rather than sending documents by mail can save hundreds of hours in time and dollars in postage. Storing reports as PDF images also can make them easier to find and retrieve.

Saving resources

Managing documents in a traditional paper environment can be time-consuming. It tends to pull staff away from projects and occupies their time with less important tasks such as searching through files, looking for lost documents, faxing, copying and mailing. If it takes five minutes to retrieve or replace a paper file, and if one employee works with 10 paper files a day, about 216 hours a year are spent searching through files—an equivalent to five weeks of work time. If the employee is paid \$20 an hour, you can instantly cut a cost of \$4,320 a year. And, what about the cost of paper folders that are misfiled or lost?

Going paperless helps increase productivity by offering quick access to electronic documents. Software programs, e-mail and server networks all enhance employee collaboration, as documents are just a few clicks away. Electronic forms and PDF files can help minimize office administrative and storage costs, as well as office supplies such as paper, toner and ink. However, be sure to back up all files. Files will be easy to retrieve, and office personnel can make better use of space. Eliminating paper also can reduce the risk of identity theft and minimize the chances of sensitive information falling into the wrong hands.

Although paper is an office necessity in some cases, it does have a costly environmental impact. With less than 5 percent of the world's population, the United States consumes 30 percent of the world's paper. The cost of storage, printing, disposal and recycling of paper often is up to 31

times more than the cost of purchasing. Reducing paper consumption saves the use of trees, water and energy, and decreases greenhouse gases. Saving 40 reams of paper is equal to 1.5 acres of pine forests absorbing carbon every year.

Do your homework

Be sure to do research before choosing a software system. Analyze the capabilities of your existing software to gain a better understanding of where the institution can run more effectively. Can your school maximize what it has, or is it time for new solutions? Call the software company to get recommendations on how the software can work smarter and more efficiently. Consider budget, and allow ample time for training. Plan during the winter, but execute in the summer when operations are likely to be less hectic.

Set realistic goals—starting off with small steps can add up quickly in savings. Choose one department to initiate the changes—whether it's enhancing software or a new installation. Most software is customized into modules that can be incorporated into training over an allotted period of time. Identify a leader to oversee the execution of the software.

Ideally, software providers will offer training continually to maximize the use of the technology tools. Webinars, live meetings or conferences via the Internet, on-site training, consulting services and refresher courses are great ways to enhance employee skills. ■

Weidenhammer is president and founder of Weidenhammer, an information technology firm headquartered in Wyomissing, Pa. He can be reached at jweidenhammer@hammer.net.

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SCHOOL SECURITY

Strategies and insight into how to
better protect students, staff and facilities.

INSIDE THIS SPECIAL SECTION:

- Using mass notification p. 32
- Protecting your assets p. 36
- Security Product Solutions p. 38

PURPOSEFUL REDUNDANCY

Redundant communication channels are vital in an emergency.

By Patrick V. Fiel Sr.



In an emergency, information is extremely critical, and it is essential to have a plan in place.

Consider the following scenarios:

- A “very small” spill of a chemical compound in a research laboratory sent 13 people to the hospital and led to evacuation of two floors of a campus building. No serious injuries resulted from exposure to the chemical, which was capable of causing symptoms ranging from headaches to death, but there was uncertainty about the dangers involved.

- Swollen with abnormal rainfall, a river running through a university campus spilled its banks, causing more than \$740 million in damages. Several buildings were damaged beyond repair, leaving thousands of students confused about where to go for their classes.

- A depressed man barged into a middle school office attempting to take the principal hostage. As the two men struggled, police arrived and arrested the attacker. The school was locked down as the media reported news of the event. Nervous parents waited for information that their children were safe.

These three events, all occurring within the past 15 months, are examples of the types of emergencies—natural and manmade—that affect campuses across the country on an almost daily basis. None of these incidents resulted in a loss of life, but each case underscores the risks when a campus cannot communicate quickly and reliably with its employees, students and parents.

Multiple solutions

In the case of an emergency, campus administrators have many ways to alert students, faculty and staff. Here

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are a few:

- Sirens.** Mounted atop poles or buildings, sirens can emit a piercing tone that gains people's attention. But is the siren signaling an approaching tornado? A flash flood? A chemical spill? A terrorist attack? It may be one of the above or dozens of other scenarios, each of which might require a different response. Without more information, a siren may do more harm than good if people react in confusion or panic.

- Text message/e-mail blast.** Internet-based systems can simultaneously send thousands of text or voice messages to people's cell phones, landlines, PDAs, laptop and desktop computers. It provides information and instructions rapidly on what protective action to take. Because nearly everyone on campus has access to one of these devices, this type of notification can be very useful and precise. Administrators or security personnel can provide highly detailed information, which is vital in a crisis. Also, the messages can be sent in many different languages to meet the preference of the recipients, including parents. Messages can be composed on a computer or by voice message over a landline or cell phone. This means school officials can create the message from a remote location in the event that a security office or administration building has been evacuated or power has been lost.

But this technology has two potential downsides. Employees, parents and students must sign up for this service, and 100 percent compliance is difficult, if not impossible, to achieve. And during an emergency, both wired and cellular phone lines may become overloaded and crash. This would limit the number of messages that can be sent when a crisis stretches beyond minutes and into hours.

Because of the possible limitations of each system, a campus should not rely on any single technology.

- Outdoor voice systems.** This type of system is ideal for large campuses where many people may be outdoors. Unlike a siren, these systems use specialized speaker technology to provide intelligible voice commands that can be heard clearly up to a quarter-mile away. The speaker arrays can be mounted permanently on poles or buildings or on a trailer for portability. Detailed instructions can be repeated continually, or new information can be added as situations change. Many of these systems have solar panels to provide power even if electricity to the campus has been lost. However, these systems do not reach people indoors or in transit to campus.

- Intercoms.** An intercom enables direct communication into classrooms, offices, residence halls and other campus



Outdoor voice systems are one way to communicate messages on campus.

buildings. However, they cannot be operated without electricity and are helpful only to those people in intercom-equipped rooms.

- LED signs.** LED signs are one of the best ways to alert employees, parents and students as they arrive at a campus by bus, car, bicycle or on foot. The messages can warn of dangers or announce that a campus has been closed. Visitors can be turned away at main campus entrances rather than add more people to an already difficult situation. However, because of their relatively small size, these signs can provide only very basic warnings.

Using a combination

Because of the possible limitations of each system, a campus should not rely on any single technology. Using redundant systems will increase the likelihood that vital information will reach people when they need it most. A combination of a siren, text-message system, outdoor voice speakers, intercoms and LED signs will give campus administrators and security staff the best opportunity for disseminating vital information during an emergency.

Electricity is critical for operating many of these systems,

so redundancy in power sources also is critical. In case of a power loss, have a battery pack, a generator or solar system available for backup.

And that is not the end of communications opportunities. Two-way radios provide a communications channel. Almost all campuses have an Internet site that can be used to post updates and warnings that will be available to those near a computer or a phone with Web access. An advantage of this source is that updates can be posted frequently and remotely.

Many colleges and universities, as well as a few high schools, have a radio or television station. During a crisis, these broadcast outlets can disseminate information. Also, some campus stakeholders may turn to local commercial radio and television stations, as well as local news websites for information. So be sure to keep these outlets updated.

Remember that a campus notification policy should be part of a larger emergency plan. As with any plan, it is important to put it in writing, share it with anyone involved—and then practice, practice and practice it.

Also, remember to incorporate other security tools that already exist on campus. For example, a camera system can play a vital role in making quick decisions at a time when events are transpiring quickly. If an evacuation is in order, cameras can help administrators and security personnel

Remember that a campus notification policy should be part of a larger emergency plan.

make sure the selected site is safe.

The goal of an emergency communications plan should be to make as much information as possible available through many different communications paths. In an emergency, when people are in danger, information is critical. By planning ahead and using redundant systems and outlets, lives may be saved and property damage limited. ■

Fiel is the public safety advisor for ADT Security Services, Alexandria, Va. For six years he was executive director of school security for Washington, D.C., Public Schools, where he managed 163 school campuses. He can be contacted at pfiel@adt.com.

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SECURE RIDES

Physical security programs can detect, deter, delay and diminish the effects of safety- and security-related issues.

By Bret E. Brooks



Parking lots for school vehicles should be illuminated properly; shielding on top of lights is cost-effective and decreases light pollution.

Thieves steal from school transportation facilities. Vandals break into local school bus lots. Universities and community colleges are victimized by auto theft. This loss of equipment has cost schools countless dollars. School transportation security often is overlooked, but it is essential to an education institution.

When tires get slashed, vehicles get spray painted, or any other type of vandalism occurs, schools suffer the monetary loss. When students slash tires in order to get classes cancelled, a district could lose thousands of dollars.

Dedicated space

During tough economic times, it is essential that schools protect transportation systems. Spending a little for protection can save a school a lot of money in the long run. Prevention is the best response.

Some easy and cost-effective steps can enhance an already established security program. If a school does not have a transportation security program, it should begin one immediately.

In addition to saving schools money, a high-quality school transportation security program can prevent violent encounters and other crimes. A couple of years ago, a school bus driver was stabbed to death after her ex-boyfriend boarded her school bus prior to the start of her day. Had there been better physical security measures in place, the attack might have been prevented.

The first step in establishing a high-quality school transportation physical security program is to designate

a specific area where all school transportation vehicles will be parked and stored. Education institutions should not allow school-related transportation vehicles to be parked at private residences, on the street, in parking garages or at other commercial properties. A dedicated parking facility where all vehicles will be left when unattended is essential. This includes not only school buses, but also vans, cars and trucks.

This designated parking area must have security lighting, and the lights must turn on automatically. Dusk-to-dawn lights are good and generally provide sufficient lighting capabilities. The lights also must turn on during other times of darkness, such as during storms or other low-visibility situations. The light must be sufficient to illuminate the entire parking complex.

Designated users

Access control and perimeter security also are critical to a security program. The parking lot perimeter must have a fence that effectively keeps unauthorized people out. A six- to eight-foot chain-link fence with triple-strand barbed wire on top generally will suffice.

Once the perimeter is set, an education institution must have a system for allowing authorized people inside and keeping unauthorized people out. Gates with locks are one way. Schools that use this method must make sure that only properly vetted employees are allowed to handle keys. If lock keys are lost or stolen, all locks must be changed immediately. One effective security method is to have people enter a building and from there move to the parking area. This method enables office personnel to screen those entering the facility and reduces the number of lock keys. Additionally, this method reduces the number of entry and exit points, which are vulnerable to security breaches.

Keys to vehicles must be locked inside a box in the transportation office. When keys are assigned to drivers, the education institution should record who received the keys, when they were issued and when the keys were returned. Do not allow drivers to retain copies of vehicle keys or lock keys. School systems should conduct a key inventory quarterly.

Physical measures

Inexpensive security measures can enhance a program's effectiveness. Placing shielding on top of lights is one cost-effective enhancement. The shielding reflects light to the ground and provides more illumination. This also decreases light pollution.

A school looking to improve perimeter security may consider a privacy fence. Privacy fences may be made of wood, metal or some other type of material that prevents someone on the outside from looking in. Adding visibility-reducing material to chain-link fencing is another cost-effective security upgrade. This mesh-like material will prevent people



Where school vehicles are stored, the parking lot perimeter must have a fence to keep out unauthorized people.

from seeing into the parking lot.

The area around a facility's perimeter must be kept clear of obstacles and hazards. Outside trees should be trimmed so limbs do not obstruct views. Bushes and shrubs should be trimmed so a person cannot use them as a hiding place. Do not have trees growing next to a fence, as intruders can use trees near perimeter fencing to climb over. Simple landscaping changes may improve security.

Cameras work both as a deterrent and as an investigative tool should an incident occur. Many inexpensive camera and digital recording systems are available. Schools using security cameras should make sure the images are recorded and maintained for at least a couple of months. Cameras require light to work properly; sufficient visible light or properly installed infrared light is essential. The better the light source, the better the images will be.

A security consultant can provide education institutions with an assessment of which security methods are working, which are ineffective, where budget resources should be focused, and where money can be saved. Schools should seek unbiased and professional outside sources for their security assessments. ■

Brooks is a state police officer, state SWAT team sniper and captain in the U.S. Army. He is a senior instructor with Gray Ram Tactical, LLC, Higginsville, Mo., a consulting and training firm that works with school faculty and bus drivers on crisis-management. He can be reached at bretbrooks@grayramtacticaltraining.com.

Responsible actions

How fast can your school lock down?

Detex Corporation. Unfortunately, it is an accepted fact that schools occasionally must go on lockdown. What that term means in individual schools varies as much as the size of school districts across the nation. Some schools define a lockdown as securing all exterior school doors. Others add all classroom doors to the exterior or the cafeteria, library and gymnasium. Whatever the term means to an institution, one key question remains foremost in the minds of school administrators, facility and security directors: What is the safest, fastest, easiest and most cost-effective means of locking down a campus?

There are as many answers as there are security manufacturers. However, one way that has been overlooked by many security door consultants is the use of panic exit devices with electrified dogging, a low-cost alternative to electric latch retraction. When installed throughout a school facility, the use of electrified dogging accomplishes several things. It enables all of the devices to be "energized" by one control switch that can be situated in a centralized area of the building. This action keeps the doors in push/pull configuration via the electronics. In case of a required lockdown, one switch can be activated that de-energizes all devices. All panic devices revert to secure mode, effectively locking every door equipped with this type of device.

When electric dogging is applied to classroom doors, a teacher, perhaps in the height of a crisis, does not have to remember where the key is and how to lock down a device on a classroom door. The administrator, taking the responsibility off the shoulders of the education staff, makes the decision and takes action to lock down.

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Security Product Overview

Secura Key. The company has released a three-minute flash video production that provides an overview of its various product lines and capabilities. The video discusses Proximity, Contactless and legacy card and reader technologies, panels and software, asset management and data collection products. ■



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Little Eco-Monsters

Are students giving you the evil "green" eye?

Many schools have begun their green journey by carrying out a host of green initiatives: green cleaning, energy and water conservation, recycling, local foods, composting and more. One of the outcomes beyond the environmental benefits is the positive response from students and staff. Perhaps even more important is the growing awareness and heightened expectations from students, who expect their schools to address these issues. Green cleaning is the right thing to do (and it makes good economic sense), and the youngest of our "supervisors" are demanding it.

Children are bombarded with eco-friendly messages, and they soaked them up like the sponges they are. "WALL-E" and "earth" brought eco-friendly messages to the movie screen and warned about the perils that await the planet if more care is not given to everyday matters. The Natural Resources Defense Council recently worked with Nickelodeon on public-service announcements and other programming called "Big Green Help." The Girl Scouts have added badges including "Environmental Health," "Get With the Land," "Earth Pact" and "Water Drop." Save the Planet, an online message forum for school children, logged 3 million page views over the past calendar year.

Young students also are learning the importance of environmental sustainability within the walls of

the classroom. Many schools have incorporated green messages within lessons. The educational publishing giant Scholastic announced that it is joining with the Rainforest Alliance to strengthen the company's sustainable paper-procurement practices.

It also has teamed with the American Museum of Natural History to create websites and magazines about climate change and other environmental issues. It also plans to publish *The Down-to-Earth Guide to Global Warming*, a book about protecting the environment.

So we have a generation of what the *New York Times* dubbed "a growing army of 'eco-kids'"—who peek in trash cans for potential recycling violations, pop in rooms to turn off unneeded lights and appliances, and turn their noses down at the SUVs in the neighborhood. They take any affront to environmentalism personally.

As summer comes to a close and those little feet fill school hallways and classrooms, remember that they most likely will give you a leery eye or two. Do your part to assure these students with well-placed signage to explain what you have been doing to make your buildings green. Create fun, age-targeted, colorful cards and posters for youngsters to read, or create handouts for the teaching staff. And look to suppliers for help; many of them offer free programs. If you took any special or newsworthy steps toward sustainability over the summer, let students know. ■

STEPHEN ASHKIN



Ashkin is executive director of the Green Cleaning Network, a 501(c)3 not-for-profit educational organization.
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Engaged Learners

What's new in the education technology marketplace?

C. WILLIAM DAY



Day is senior analyst at KBD Planning Group, Young Harris, Ga., a firm specialized in educational facilities and technology planning. He can be reached at bday@kbdplanning.com. www.kbdplanning.com

In the “old days,” teachers could teach with simple chalk and talk because students thought teachers knew everything. Then along came the information age, and students turned to digital. Most people understand that students today learn differently and may feel disconnected from teaching and learning styles that were designed for their parents.

Students now use many means to stay in touch with their peers and to acquire information: cell phones, iPods, e-mail, text messaging, the Internet, blogs and instant messaging. These students are multi-taskers. They see no problem with simultaneously watching TV, browsing the Internet, listening to music and texting their friends.

Today's classrooms are being designed with multiple electronic display devices, including ceiling-mounted video projectors and large screens, interactive whiteboards, LCD flatscreens and document cameras. The key in all of this is that students are engaged.

Another device making its way into the classroom is a student response system. These systems typically employ handheld devices that each student uses to respond to questions from an instructor. A teacher is able to receive immediate and individual feedback from students about how well they are comprehending the curriculum.

Student response systems can encourage class participation in K-12 and higher education. Teachers can use this technology to evaluate the collective understanding of an entire

class and track individual student learning at the point of instruction. Interactive questions can help in reviewing assigned materials, confirming attendance, awarding participation points and grading tests. A teacher can generate reports for virtually all course needs, from individual student participation scores to entire section results, or evaluate results based on demographics or work groups.

Another cool trend taking place in technology for education is the improvement in display monitors—not only improved LCDs, but also the new LED (light-emitting diodes) technology displays that will be coming soon. LEDs working in conjunction with DLP (digital light processing) for rear-projection TVs eliminate the need for bulbs and color wheels to produce the images on screen. Red, green and blue LEDs fire sequentially to produce the color and provide the illumination needed for lighting the display.

The only real negatives are ones that can be overcome with future improvements in LED technology. The brightness in first-generation LEDs didn't suit larger displays (60 inches or more), and the price of LED televisions is higher than similarly sized LCD models. But, manufacturers are scheduled this year to release a 61-inch LED TV, and the price gap between LEDs and LCD has narrowed in recent months.

Technology is transforming the way students learn. School administrators must be willing to provide the resources necessary for teachers and students to achieve. ■

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To bolster the existing alerting capabilities, UCLA sought a reliable, network-centric emergency alerting system that could reach the nearly 49,000 students, faculty and staff quickly by unifying multiple communication channels and devices, such as cell phones, BlackBerry devices and networked computers.

UCLA found AtHoc IWSAlerts, a unified, network-centric alerting solution that uses an existing IP network and turns it into a reliable and effective mass-notification system. UCLA now uses a comprehensive alerting system that can reach the campus population simultaneously through many channels, including computers, telephones (mobile and landline), text messaging, e-mail, campus sirens, campus cable TV, campus radio and the Emergency Digital Information System.

The first critical test of the UCLA alert system happened in July 2008, when a 5.4-magnitude earthquake hit Los Angeles.

Within minutes, UCLA emergency managers triggered their "BruinAlert" to notify the campus population of the earthquake. The first alerts were sent to students, faculty and staff, who received a combination of desktop notifications, e-mails and text messages. They were informed that an earthquake had occurred, were warned about aftershocks, and directed to tune into the campus radio station for additional instructions. With a reach of more than 97 percent of the campus population, the system successfully notified individuals within minutes.

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UCLA students take part in an active-shooter scenario as part of a multi-agency drill. Photo courtesy of UCLA Newsroom

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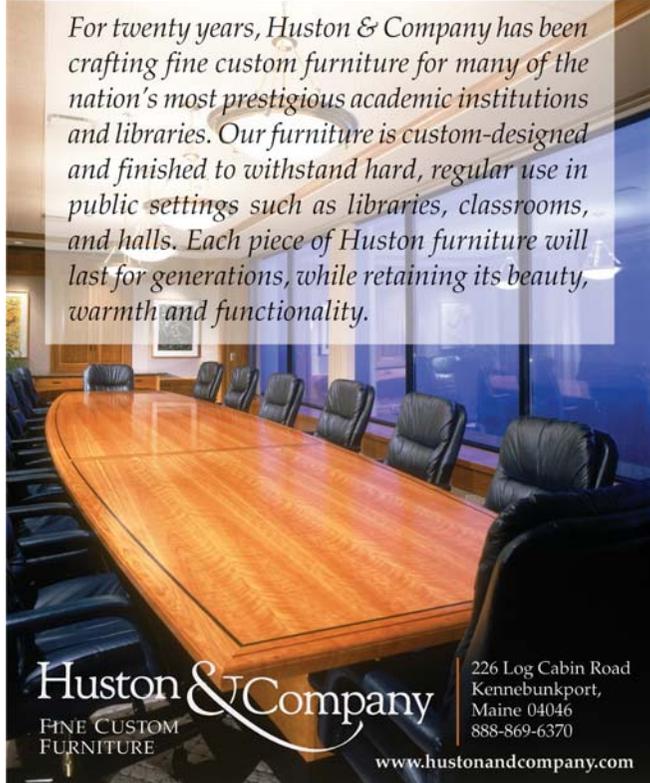
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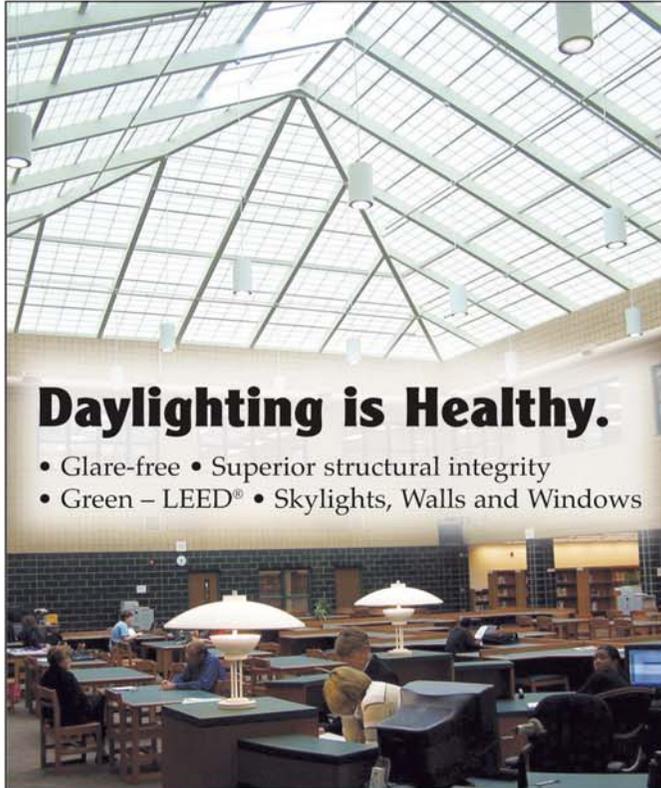


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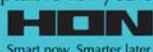
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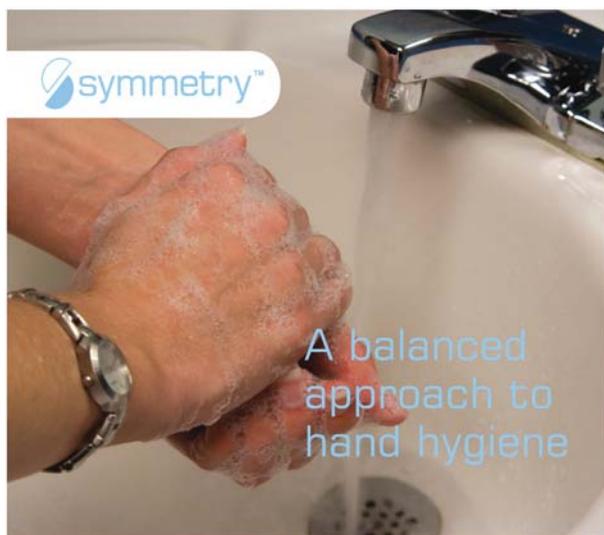
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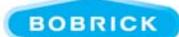
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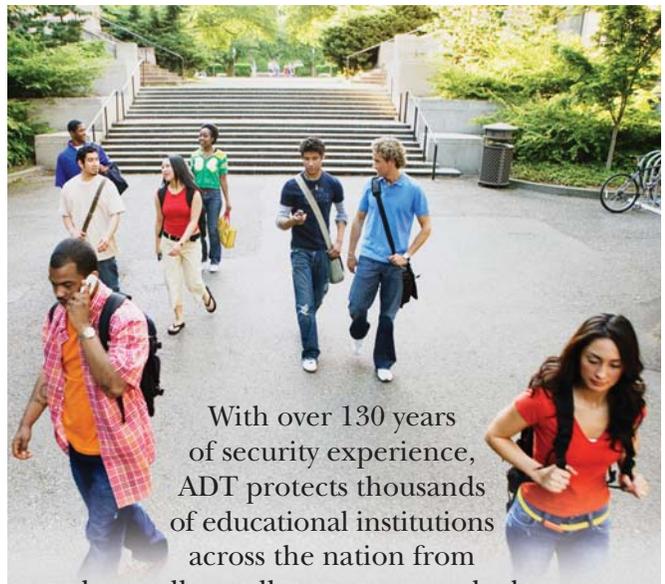
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- D Digital
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3. Which best describes your job title? (check only one)

- J Buildings & Grounds/Physical Plant/Facilities:
Asst. Supt. of., VP of., Director of., Manager of.,
Supervisor of: _____
G Business/Finance: Asst. Supt. of., VP of., Director of.,
Manager of., Supervisor of: _____
E District Superintendent of Schools
F Facilities Planning: Asst. Supt. of., VP of., Director of.,
Manager of., Supervisor of: _____
C Housing/Residential Life: Asst. Supt. of., VP of.,
Director of., Manager of., Supervisor of: _____
H Purchasing: Asst. Supt. of., VP of., Director of.,
Manager of., Supervisor of: _____
S Safety & Security: Asst. Supt. of., VP of., Director of.,
Manager of., Supervisor of: _____
N Architect, Engineer or Consultant
X Other _____
(please specify)

5. What is the enrollment size of your school district or university/college? (check only one)

- L 30,000 or over
K 25,000-29,999
J 20,000-24,999
P 15,000-19,999
N 10,000-14,999
G 5,000-9,999
F 2,500-4,999
E 1,000-2,499
M Under 1,000

6. Total number of buildings:

- 1 100+
2 76-100
3 51-75
4 21-50
5 11-20
6 6-10
7 5 or less

7. Total square feet of buildings directly involved with:

- 1 10 million+
2 7-9 million
3 4-6 million
4 1-3 million
5 500,000-999,999
6 less than 500,000

4. Which category best describes your work in Educational Administration? (check only one)

- 1 Public School District (K-12)
3 Private School (K-12)
6 Two-Year College (Public or Private)
5 Four-Year College/University (Public or Private)
2 Post-Secondary School (medical, law, seminary, etc.)
4 Independent or Government Vocational School (including school operated by industry, union, government or association)
7 Architectural, Engineering or Consulting Services
0 Other _____
(please specify)

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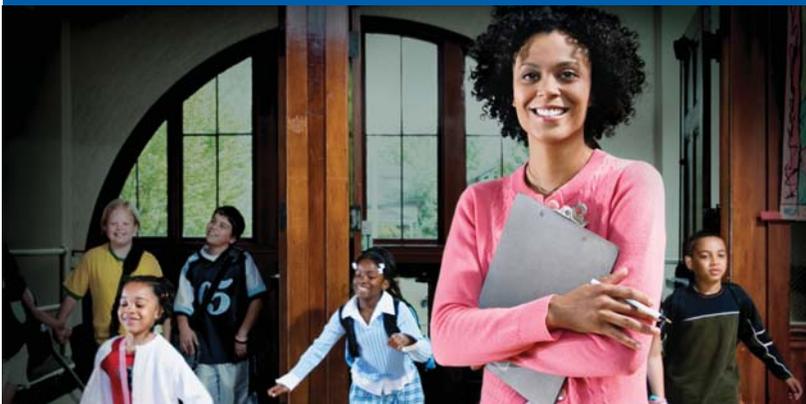
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