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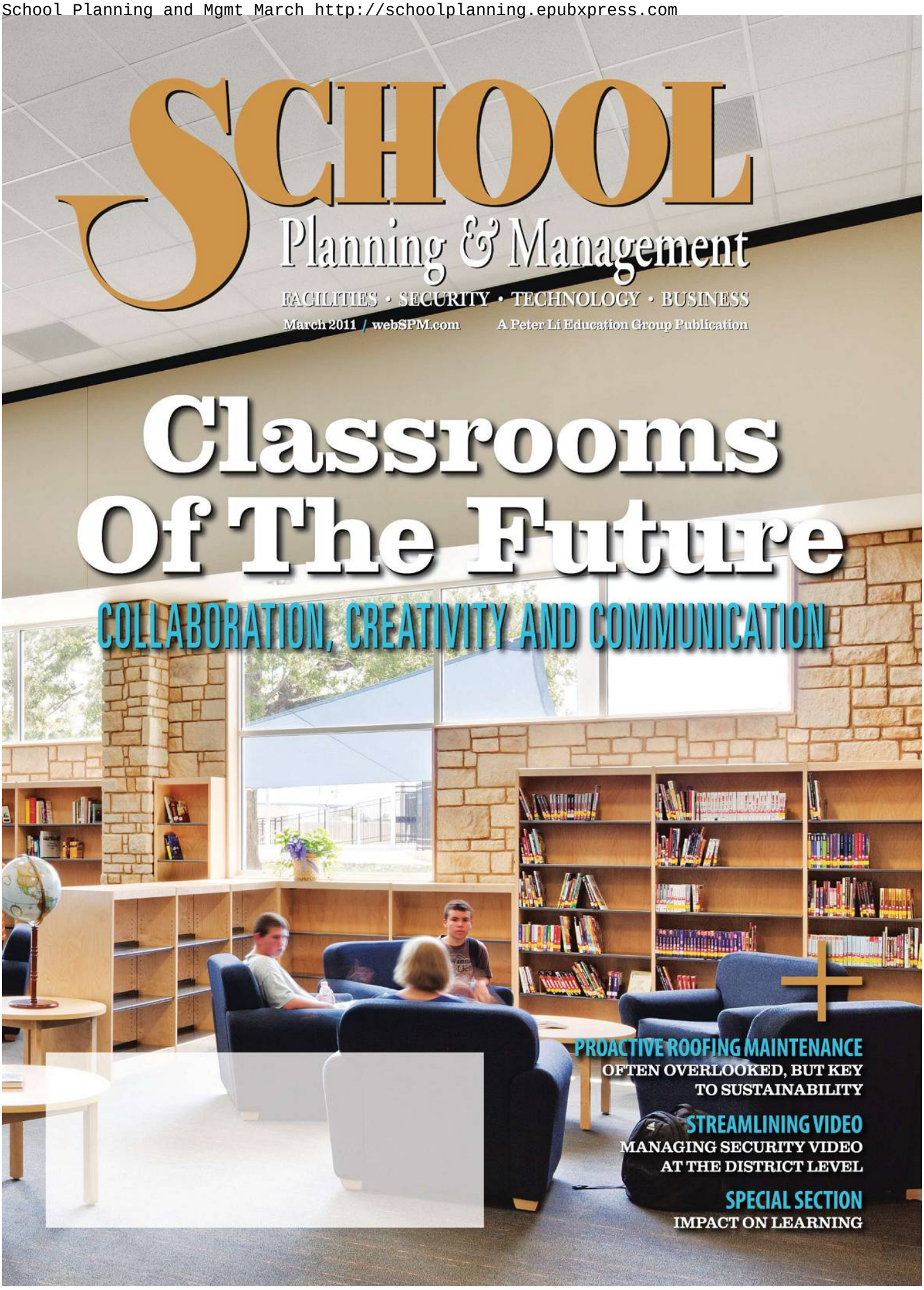
Classrooms Of The Future

COLLABORATION, CREATIVITY AND COMMUNICATION



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PROACTIVE ROOFING MAINTENANCE
OFTEN OVERLOOKED, BUT KEY TO SUSTAINABILITY

STREAMLINING VIDEO
MANAGING SECURITY VIDEO AT THE DISTRICT LEVEL

SPECIAL SECTION
IMPACT ON LEARNING

Don't Do That!

Top five things to avoid when planning for classroom technology.

BY STEVEN J. THORBURN, PE, LEED-AP, CTS-D, CTS-1

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Something hard for a baby boomer to use is easy for the young digital natives that are in school trying to learn how to think and reason their way out of a project. What works for a person or a small group of people in an intimate setting on the park bench or cafeteria table does not translate to good class or training room design. This article looks at the some of the many things you need to avoid when planning for technology in a learning environment.

1 IMAGE IS TOO SMALL

In our current world of flat panel displays, high-resolution laptops and computers, and smart whiteboards, we have created a world of eyestrain. Look around — how many folks do you know that require eyeglasses in order to see what they are working on? If they work with computer displays on a daily basis, then I am sure most of them need eyeglasses. So how big does an image need to be in order for everyone to see it, read it or view it? Many years ago, Dr. Kim Milliken pioneered the "4–6–8 rule," that states a viewer needs to be within "four image heights" of the display (computer, large flat panel, projection image, painting, etc.) in order to "inspect" the image (CADD/map reading), six times to "read"

it (word processing) and eight times to "view" it (TV) for examples.

While this is a good starting point, we now need to consider the very high pixel density of our new computers and the HDTV displays to which we have become accustomed. While we have enjoyed 1024 by 768 VGA displays, we are now looking at a third, or in some cases, almost twice the number of vertical pixels in our 1920 by 1200 computer displays. We are keeping our same laptop image heights; we are just getting wider screens. Therefore, unless you are using larger fonts, we need to adjust the established rules or your text will get too small to read.

Likewise, some schools say, "Let's just put up a flat panel, we do not need a projected image." Yes, flat panels have many benefits, yet they come with as many hurdles to overcome. On one hand, we have the same pixel density issue as our laptop display, but we also face the issue of the distance to the furthest view. A 65-inch flat-panel display only has an image height of about 30 inches. So, if you are going to look at spreadsheets that are using large fonts, then you would need to be within 15 feet of the display (180 inches or 30-inch image times six). That is a very short distance, and very few schools can consider direct-view displays that are much larger than 65 inches due to cost.

2 ELECTRONIC SMART WHITEBOARDS ARE NOT ALWAYS A SMART DECISION

Electronic whiteboards or "smart boards" are typically 48 inches in height. This presents us a number of issues, including accessibility and readability — without getting into any of the software or hardware issues. In California, the state architect requires that the bottom of the whiteboard be no more than 24 inches above the floor. This is to allow individuals in wheelchairs to reach it, as well as younger students. The problem here is the average seated head-height is somewhere around 36 inches, so the person sitting in

front of you blocks the lower 25 percent of the screen surface. Likewise, if we did have our full 48 inches in height, the average viewer should only be 24 feet from the whiteboard, and 18 feet if we have it only 24 inches above the floor.

Therefore, ADA wheelchair accessibility now affects the sight lines to the white or smart board. That also means the top of the display is about six feet above the floor. If you want to use the smart board as a projection surface, you now have additional issues. If the projector is properly installed with the lens at about six feet above the floor, it no longer provides the minimum clear head-height in the room. This means the projector will be mounted well above the top of the display, angled downward, requiring adjustments to be made inside the projector to blend pixels — we no longer have a crisp clear image since we start with a blurred image due to the digital keystone correction. In this case, we have a compromised installation; a system that the teacher gets to interact with by casting shadows. (However, this is the topic for a completely different rant.)

3 CAMERAS NEED TO SEE TOO

Are you are working with distance learning or lecture capture or anything that uses a camera in the classroom? Can the camera see what it needs to see with the correct resolution? Is there enough light for the camera to capture the image? What does the depth of field look like? Suddenly the designer must consider a host of issues that are not typically of concern. I love the rooms that have the camera high up in the back corner… for what I call the dome view — where all we view is a sea of domes (students' heads). That camera should be lower… approximately head height. Yes, the students' heads will be in the way for some of the images, but when you go to class, unless you are in the front row, there are always students in front of you. Placing a camera at a lower height helps create the sense of "being there."

4 LIGHTING CONTROL SHOULD BE INTUITIVE

It always amazes me when I walk into a room and find a row of light switches adorning the wall inside the door. Usually there are two or three double-gang wall plates separated by two or three single-gang plates, plus one or two are slightly higher or lower than the rest and may even have a different color. Alternatively, there are no switches near the door and you have to walk down several steps to the front of the room where all of the switches are on the wall near the podium. None of the switches will be labeled, so all of the lights are turned on and off in order to create the desired environment. We always suggest there be at a minimum three light switches set up so that the front row of lights can be on/off with the rest of the lights controlled by two other switches providing for 1/3, 2/3 or all on. This helps improve contrast on the screen yet allow for note taking (high or low levels). Another common issue is that the emergency exit light will cast a green or red glow onto the projection screen, making everything projected look like it originated in outer space.

5 ACOUSTICS CAN MAKE A DIFFERENCE

It is interesting to consider that modern architectural acoustics is a relatively new science attributed to Wallace Clement Sabine, who first applied scientific principles to the acoustics within Fogg Lecture Hall in 1895. In ancient times (where there was no artificial amplification of the noise source), acoustics depended upon the physical design of the amphitheatre or gathering space. More recently, the thought was that electronic audio systems could overcome any design issue. Today, we realize that again we must pay attention to the acoustical environment in order for spaces to function as desired. Sustainable design practices such as CHPS (the Collaborative for High Performance Schools) and LEED for Schools require attention to the acoustics within the learning environment. Younger children do not have the life experience necessary to "fill in the gaps" if they cannot hear the entire sentence. This is also true within higher education where the topic is complex or technical in nature — if you do not hear all of a sentence, you often do not have enough of a frame of reference to understand the material. So, what is the bottom line? If a learning space has too much background noise, learning suffers. Background noise can come from mechanical systems, excess reverberation within the space or exterior noise sources (such as busy roads or noise from an adjacent classroom or hallway).

This is a just a taste of the many issues that need to be considered when planning for technology. Just because we "can" do something, does not mean we should! If you have questions, we would love to talk with you. SPM

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