School Facility Design for Today and Tomorrow

District leaders should be forward-thinking as they plan new construction and renovation projects.

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Facility designers are tasked with designing schools that meet the needs of students today and in the future.

Today's educators are preparing students for jobs that don't yet exist. Concomitantly, facility designers are tasked with designing school buildings to support the students, staff, and instructional programs with an eye to the future. When they are considering new construction and renovation projects, school district leaders should be forward thinking and should consider the following elements of school facility design.

Expanded Technology Use

Nearly every facet of our lives is influenced by technology, and its integration into students' education is imperative. Yet the need for technology in K–12 education can put significant demands on school facilities and infrastructure. A clear technology blueprint must consider such elements as student engagement, digital backpacks, personalized learning, one-to-one distribution, and 24-7 learning.

Classroom technology should support group interaction, collaboration, and communication. Apart from those applications that require higher-end hardware, such as building information modeling and video editing, there is a shift away from stand-alone computer labs toward portable computing devices, such as iPads and Chromebooks. Similarly, a large-format touch-screen computer might be more conducive to the learning environment than a whiteboard or projector.

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More and more, teachers are embracing the use of students' personal devices as learning tools. That means campuses must offer sufficient Wi-Fi for both school-issued and personal devices, network and content security, and a building infrastructure that can handle future needs.

When expanding the use of personal technology in the classroom, one often-forgotten need is power. Personal learning devices must be charged up when students are ready to learn, and that means charging stations. Some districts use portable carts, which require a dedicated circuit at a conveniently located receptacle. Some locate charging stations in classrooms; others locate them in corridors, alcoves, or the library–media center. For stable installations, a surface-mount raceway (Wiremold) is more appropriate, allowing ready access to connect multiple computers to a power source.

Lighting Strategies

Natural light enriches and creates more interesting and dynamic learning environments. Glazing technology for windows has improved, and options for daylighting have dramatically increased recently.

Of equal importance, natural lighting has a positive effect on student health, learning ability, and sense of well-being. However, too much lighting in the form of glare and overlighting distracts and can negate the benefits. Windows can be tuned to manage the amount of light according to the amount of sun exposure those windows will receive.

Special attention should be given to window placement in spaces with display technologies such as whiteboards, so as not to create distracting glare or washout conditions. Strategic placement by the design team will manage lighting levels, glare, and unwanted solar heat gains and losses.

Popular daylighting and control options include tubular daylight devices, clerestories, shading devices, light shelves, and translucent skylight systems. Furthermore, daylighting can be improved by controlling glare with

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window films if existing windows are low-emissivity glass that reduces the transfer of heat or cold through windows.

Artificial lighting also contributes to the strategy. A growing trend is to provide direct-indirect lighting fixtures, such that at least half of the light can be directed up, bouncing off the ceiling and other surfaces. The benefits include a more uniform ambient light level with fewer "hot" spots, reduced glare, a need for fewer fixtures, and lowered energy use.

Strategic product placement by the design team will manage lighting levels, glare, and unwanted solar heat gains and losses.

To make beneficial adjustments to existing space, consider reducing light levels in typically overlit areas, such as cafeterias, corridors, and gymnasiums. As well, look at replacing outdated fixtures with LED-based units and installing multilevel switching for flexibility in the classrooms.

Although the benefits of timers and motion sensors to reduce unnecessary lights are common, sensors are now available that measure the daylight level in the room (or areas of a room) and adjust it appropriately. Lamp "color temperature" can also have an effect: cool colors can be perceived as harsh and sterile, whereas warm colors can have a relaxing, natural effect. LED lamp technology is available that can dynamically adjust color temperature—and in fact can introduce almost any color—to suit a specific need or desire.

Noninvasive Security

Schools now face the difficult incompatibility of needing to be both welcoming and secure. Unfortunately, a determined person may find a way inside no matter what measures are instituted, but a strategy of slowing that person down enough to head off a situation can be developed with extra measures.

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Driveway design, decorative site fixtures, landscaping, and even building setbacks can all help minimize a threat before an intruder even gets near the building. A video intercom system can monitor visitors and establish their identity before allowing them into the school.

Once visitors are granted access, they should pass through or by the reception area, before entering the core of the school. Many schools provide additional security for office staff by incorporating a transaction window, increasingly including bullet-resistant glazing. Panic buttons can concurrently notify law enforcement and communicate with the district's alarm company, administration, and even the rest of the school.

Permitting views from hallways into classrooms is no longer considered wise in light of recent intruder situations and the need for classroom lockdowns. Classroom security functions should let the teacher lock the room without opening the door. Electronic locks on both exterior and interior doors are a possibility, providing usage tracking and various levels of access; some systems also provide remote locking and status assessments.

Finishing Touches

Students, faculty, and staff all benefit from the use of low- or no-VOC (volatile organic compound) products, such as paints, adhesives, furniture, flooring systems, and cabinetry, creating a healthier learning and working environment. Such sustainable products are now common and are more affordable.

Acoustic control through a mixture of interior finishes is more important than ever in light of the increased focus on collaboration, discussion, and communication. Hypoallergenic carpeting not only is better for the body, but when paired with common ceiling tile systems, it also reduces the distracting and fatiguing echo chamber effect often found with hard surfaces. External noise from the street and neighboring classrooms can be mitigated by using appropriate building materials and sound-rated window and door systems.

Natural materials, pleasing textures, and an array of warm colors create a less institutional, more engaging feel. School districts are increasingly taking cues from colleges and universities to create environments that students want to use, moving away from the standard concrete block and vinyl tile institutions of the past.

Flexibility in Space and Furniture

Rigidity is the nemesis of innovative education. Flexibility empowers teachers to create diverse activity areas, assign work groups of varied sizes, and provide a forum for shared learning among students.

A key aspect of current educational design is to prepare a workforce that is not only proficient in the STEM (science,

Today's classrooms must promote collaboration and hands-on learning.

Teachers can create flexible, dynamic workplaces for students with diverse learning styles.

technology, engineering, and math) disciplines but also skillful in collaboration, arts, and social sciences. Consider how the space can accommodate project-based, 21st-century learning, whether you are looking at new construction or remodeling a dated facility.

Triangular or trapezoid-shaped desks that provide configuration options promote all kinds of group work, from small-group projects to whole-group discussions. Informal seating options, such as soft café-style seating, stability balls, beanbags, and standing stations add to the adaptability of the environment, whether it's classrooms, cafeterias, breakout spaces, or the library–media center.

Ergonomic seating options can help students focus by reducing muscle and joint strain and the tendency to fidget.

Existing classrooms can often be made more flexible for diverse teaching and learning styles simply by rearranging furniture or purchasing more adaptable furnishings. Room dividers that double as tackboards, writing surfaces, storage units, or bookcases can increase a teacher's options while accommodating a restricted budget.

Flexible presentation technology, used by the teachers as well as the students, allows additional options for sharing ideas and presenting concepts and is almost a necessity in today's classrooms. Ergonomic seating options can help students focus by reducing muscle and joint strain and the tendency to fidget.

New educational theories and teaching methods have put increased importance on communication and collaboration regarding the need for space and furnishings to support instruction.

Looking to the Future

To prepare our current and future students for the colleges and careers of tomorrow, we must be keenly aware of the evolution of educational design today. A strong facilities assessment and creative planning can lead to the creation of a truly 21st-century learning environment while building in flexibility to accommodate an unforeseen future.

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