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Integrating Technology into K-12 School Design

By Ken Syvertsen, R.A.

The use of advanced technology in schools is no longer reserved solely for dedicated spaces such as computer labs, media centers, and libraries. The past 10 years have seen an evolution from traditional, chalkboard-focused classrooms to those that include multimedia-teaching tools, such as projectors, A/V equipment, and wireless technology. More than 75% of the public schools in the United States now have computers in classrooms, according to the National Center for Education Statistics.

The integration of such technology into the school environment has many effects on school design—how a classroom is designed, type of lighting used, space proportions, equipment choices, and orientation. And equally important is how the backbone electrical and telecommunications systems are designed to accommodate changeover to newer technologies.

Technology Plan

Planning for integration of technology into a K-12 facility must be undertaken with a holistic mindset. Programming and planning must include input from teachers, faculty, school administrators, and parents. This way, educational requirements, teaching methods, and technology needs are all taken into account. In addition, since it often takes many years from conception to actual implementation, the technology plan should be continually evaluated to ensure compliance with the school's teaching methods and inclusion of the most current technology.

School buildings typically are designed with a 70-year life expectancy. As such, it is important to consider emerging teaching trends before undertaking a new construction or renovation project for a K-12 facility. One such trend is the expanded emphasis on technology as the main vehicle for instructional delivery. Several items can be incorporated into the design of today's spaces to allow for greater flexibility for tomorrow's uses, such as movable walls, partitions, furniture, adaptable electrical and telecommunications systems, and adjustable lighting, among others.

The design of technology-empowered classrooms includes many complex requirements that address teaching styles and educational delivery methods. For example, a flexible classroom and system design will allow teachers to project images on computer monitors, teaching surfaces, or projection screens. This flexibility supports whatever method a teacher is comfortable using and will make the learning environment a dynamic and interesting space that should be successful for both teachers and students alike.

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Installation Considerations

Whether integrating technology into a new school or retrofitting an existing facility, several design considerations are key:

Space and proportion

The area per student must be increased in order to accommodate computer hardware and actual room layout. Room proportions should be designed at a 3:2 length-to-width ratio to minimize the distance of the last seating row from the teacher and the main teaching surface. Also, ceiling heights should be raised (typically to a height of 10 feet or more) to accommodate wall- or ceiling-mounted projection screens, TVs, and computer monitors.

Several smaller rooms can be separated from each other with movable partitions so that larger, flexible spaces can be created. This setup allows teachers to gather several classes together for team teaching or large group instruction. The movable walls should provide good sound isolation, with a Sound Transmission Class (STC) of 53 or better. This flexible classroom arrangement allows educators to modify the physical environment to address the specific needs of the educational delivery method, whether it is projected on a teaching surface, displayed on individual computers, or in another format.

Lighting

Classrooms should be provided with both natural and artificial lighting. Lighting should be designed to allow for layering of light. When layering, use a variety of light sources to create a flexible, inviting space. Multiple lighting levels allow for the different teaching methods that may occur within the room. Adding dimmers to fixtures increases the range of moods produced through illumination.

Good daylighting design includes creating balanced lighting levels from multiple directions (windowsand skylights) and providing adequate interior and exterior shading devices-operable blinds, louvers, screens, or architectural features. Special precautions should be taken with natural lighting, as incorrect levels of natural light can increase the classroom's heat gain and solar glare on computer terminals and projections.

Artificial lighting should be delivered through a combination of direct and indirect light fixtures.

Furniture

Vary the furniture in classrooms to include appropriate percentages of student desks, tables, and computer workstations. By having multiple furniture types available within a room, the space can be arranged to reflect different teaching and learning opportunities, such as individual study, small group instruction, team projects, and large group instruction.

Flexibility and Simplicity

In the design of today's school building, two words are of paramount importance: simple and flexible. Technology should be easy to use. Learning environments must be designed to not only respond to current educational needs, but also to emerging educational trends. The more flexible the space's layout and design, the easier it will be to make future chaqges. Good design takes significant effort from administrations, educators, students, and designers in order to create the best possible learning environments.

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