Research Paper
FURNITURE FOR 21ST CENTURY SCHOOLS

21st Century schools are needed to teach 21st Century skills: collaboration, creativity and problem-solving … and 21st Century furniture is needed to help create a school environment that supports student success. This LS3P Research *Research Paper* highlights some important considerations when selecting furniture for 21st Century schools. It first identifies principles and primary components of 21st Century schools before setting out their implications for building and classroom design and furniture selection and arrangement. It also points out some notable differences and additional considerations with respect to furniture for specific spaces and grade levels.

Reference materials used to prepare this paper are listed (and hyperlinked) at the end. They come from authorities directly involved in spearheading the transition to 21st Century schools and in researching its merits such as:

- **America's Schoolhouse Council (ASC)** – A national consortium of education architects, planners and designers that conceived the demonstration project known as "Flip This Classroom: Learning Environments Matter" which is based on the Dunn & Dunn Learning Style Model of Instruction emphasizing students' individual learning strengths and preferences and proved that physical learning environments – specifically, furnishings, floor coverings, presentation and audio systems, lighting – support student success;

- **Department of Defense Education Activity (DoDEA)** – DoDEA is a field activity of the Office of the Secretary of Defense. Its' mission is to plan, direct, coordinate and manage the education programs for eligible dependents of U.S. military personnel and civilian personnel of the Department of Defense. DoDEA is aggressively working to define its 21st Century pedagogy and the design of its school facilities, incorporating "concepts for innovation in education curriculum, the use of future technology, and current best practices in facility design including the growing expectation for sustainability"; and

- **VS (Germany) and VS America, Inc**. – VS is a manufacturer of educational furniture for over 100 years and is now the largest in Europe. VS America was founded in Charlotte, NC in 2003. The company focus is on developing and offering furniture solutions for "the modern school": flexible, ergonomic, mobile, accommodating technology and sustainable. It collaborated with America's Schoolhouse Council and member architects on discussion and research that culminated in the publication, INSIGHTS 2 by VS.

In addition, numerous third parties are reporting on this movement. Several articles written by or with input from school administrators, teachers, architects, designers, and others were referred to, including those in:

- *American School and University* magazine (a Penton Media, Inc. publication); and

- *School Planning and Management* magazine (a Peter Li Education Group publication).

PRINCIPLES AND PRIMARY COMPONENTS OF 21ST CENTURY SCHOOLS

The report, *Facilities for 21st Century Learning*, prepared by Jacobs on behalf of the Department of Defense Education Activity (DoDEA), documents the results of three work sessions held in 2011 with DoDEA and recognized design leaders, including LS3P, that culminated in "Incorporating Innovation into Design".

It sets out **three guiding principles** for K-12 facilities:

- **Provide student-centered facilities for all learners** – This is a paradigm shift of the focus of instruction away from teacher-centered that aligns with current behavior patterns impacted by advancements in technology;

- **Be flexible and adaptable** – Flexible and adaptable spaces and furniture that can change throughout the school day and over the longer term are required to accommodate the student-centered paradigm and advances in technology and teaching methods, and
- **Be global community-centered within the school and encompassing the local and global community** – Enhance capabilities of interacting within a diverse yet increasingly connected world, while incorporating local cultures and community .

It also stresses that an emphasis should be placed on **two primary components** for 21st Century education facilities:
- **Neighborhood model** – This organizational structure provides an environment for group and individual learning opportunities, with a variety of flexible and adaptable spaces for a small community of learners as well as common areas to reinforce a sense of community and scaled-down spaces for traditionally centralized functions; and
- **Core spaces** – Shared activity spaces – often referred to as "Learning Streets" – for the larger community or school, including The Commons, Athletics/PE, Performance, Community Spaces and Food Preparation.

It adds that there is also a need to accommodate **other specific space types** in the neighborhood model, such as learning studios, language arts, early childhood, information center, food court, small group spaces, math/science, educator spaces and technology.

DoDEA is now in the stages of establishing clear direction and criteria for future school planning and design based on these principles for inclusion in educational specifications and design manuals.

IMPLICATIONS FOR BUILDING AND CLASSROOM DESIGN

The major themes for 21st Century education that emerged from the DoDEA work sessions as **building design precepts** and build on the guiding principles include, as quoted from the report (page iv, with bold and italic font added for emphasis):
- **"Flexible "Neighborhood"** organizational themes that include a *variety* of physical learning settings;
- **Shared *Core* Spaces** (Outside the 'Neighborhood") for functions used by more than one Neighborhood, such as gym and auditorium;
- **Shared *Common* Spaces** for performance, presentation and gathering spaces – the *"heart"* of the school;
- Moving **some learning** environments to the ***net-to-gross* spaces** (space typically unassigned circulation) also known as "Learning Streets";
- Recognize the **school facilities as learning tools**;
- Merging **indoor and outdoor** learning settings;
- Recognize the **strategic role of *moveable* furnishings** (FFE) in forming differentiated learning spaces;
- **Sustainable design** elements including active and passive incorporation of sustainable design technologies; and
- **Warm, safe, and secure** design."

Note that these building design precepts include one that specifically relates to furniture, although all have implications for furniture selection.

Additional commonly-accepted building design concepts for 21st Century schools that should also be included are:
- The **"front of the classroom"** is anywhere; and
- **High performance** building environments include space and functionality of building and rooms, acoustics, daylighting and illumination, physical comfort, indoor environmental quality, safety and security, technology, appearance, materials, energy and water conservation.

The 21st Century classroom places an emphasis on collaboration, communication, creativity and adaptability. Based on research conducted by Steelcase Inc.'s WorkSpace Futures group on classrooms, it has developed the following **design principles for 21st Century classrooms**:

- Design for **multiple rhythms** in the same classroom – Classrooms providing flexibility to support easy transitions to different teaching methods and learning modes (especially student-centered learning), with different zones for different activities;

- Allow **everyone** to be **seen and heard** – Good visual and physical access between students and teacher and to presentation surfaces, adequate horizontal and vertical work surfaces;

- Take advantage of **new media** – Integrating mixed media that can be used easily by students and teachers, creating spaces that encourage group discussion, providing interactive whiteboards and laptops with small projectors and WiFi; and

- Provide **seating** that **supports active learning** – Seating that encourages participation and collaboration, that is comfortable, easily adjusted and relocated.

IMPLICATIONS FOR FURNITURE SELECTION + ARRANGEMENT

Furniture plays an important role in 21st Century schools, providing critical support to learning. Its ultimate purpose is to contribute to student success. To this end, it should consist of:

- Furniture that suits the learning activity;

- Furniture that supports diverse learning styles and new teaching styles;

- Furniture that meets the physical needs of students to help keep them healthy, comfortable and engaged in learning;

- Furniture that fosters a sense of community; and

- Furniture that maximizes utilization of space and meets budget and sustainability criteria.

The more significant aspects of 21st Century schools with regard to **furniture selection and arrangement in general** are highlighted below:

- **Flexibility, adaptability and mobility**
  - Flexible, adaptable and mobile furniture that can be used for different activities, in easily-reconfigurable arrangements such as rows, clusters and circles and quickly stacked, nested and stored both throughout the school day and over the longer term in order to accommodate student-centered, collaborative and group learning as well as advances in technology and teaching methods;
  - A furniture system, series or "kit of parts" – chairs, desks and shelving on casters, and movable panels and partitions, as well as carts for teaching tools;
  - Furniture that is both durable and light-weight so it can stand up to frequent moves and be easily and safely moved;
  - Movable cabinetry and storage units of various configurations and heights to not only store items but help define spaces and provide acoustical insulation/isolation, display capabilities and more;
  - Specialized pieces such as mobile science demonstration stations that come complete with sinks and bottled water, a Bunsen burner connected to a small propane tank;
  - "Less is more" for furniture in flexible learning environments – to avoid congestion and chaos;
  - Types of furniture that encourage **collaboration** (planned and spontaneous) and group work within a 21st Century school include, as identified in David Stewart's, Margaret Sullivan's and Mira Korber's articles:

- o Geometrically-shaped (e.g., trapezoids) and mobile desks and tables that can fit together in groups of 4, 6 or 8 to form spaces and surfaces for group work and modified teaching landscapes such as hexagons for open dialogue and pinwheels for collaboration zones. Accompanied by mobile chairs, on casters;
  - o Mobile whiteboards, screens, low shelving and temporary storage to divide open spaces and provide privacy;
  - o Storage of educational materials that students can access;
  - o Café tables and chairs;
  - o Booth seating (i.e., higher backs on lounge seats) combined with small, powered conference tables (some with panel-mounted monitors and plug-ins for laptops and tablets for presentation options);
  - o Large tables at coffee-table heights, along with lounge or executive task chairs on casters;
  - o Replacing single study carrels with 2- to 3-person workstations in libraries/resource centers;
  - o Office bench systems with open, flat work surfaces and low divider screens between facing workers, and adjacent, breakaway lounge seating;
  - o Backless, modular benches and ottomans that can be linked together and placed in hallways and other common areas;
- – As Paul Erickson writes in his article in ASU magazine,

  > "Furniture must adjust, swivel, tilt, rock, reconfigure, move and store … Inclined seating enables front-to-back position movement, adjusting the center of gravity, and providing a three-dimensional rocking mechanism. Full height-adjustable round tables support mobility … Furniture with castors facilitates frequent rearrangements of learning spaces."

- **Variety**
  - – Furniture that suits the variety of spaces needed for individual work, small- and large-group work, lectures, presentations, breakouts and interactions with instructors;
  - – Furniture that supports a variety of learning skills, styles and needs;
  - – A variety of seating configurations available throughout the day – beanbags for individual study, soft seating for small meetings, ganging tables for small group work; also providing opportunity for movement and exercise;
  - – In Paul Erickson's article, he adds "Having variety in furniture supports differing learning styles: low-to-high-top tables and desks, stools, adjustable chairs and soft furnishings … "

- **Enabling technology**
  - – Furniture that seamlessly accommodates and integrates today's technology (e.g., laptops, handheld mobile devices, whiteboards, etc.) to support student learning and teaching (e.g., media-rich presentations);
  - – Furniture that reflects the technology choices made (e.g., fixed computer stations vs. laptop hotspots) for instructional methods;
  - – Workstations sized to accommodate desktop computers, portable laptops, netbooks and teacher tools;
  - – Student desks wide enough to accommodate a laptop and textbook or writing surface side-by-side;
  - – Mobile computer carts that store and charge laptops and tablets;
  - – Power and network access integrated into nearly all furniture concepts (e.g., chairs with power sockets in the arms), allowing users to quickly connect laptops and mobile devices and switch between users, even furniture with wireless power technology to charge electronic devices without a cord;

- Interactive whiteboards with Internet access (although typical wall mountings limit flexibility) … greater flexibility with a laptop, small projector and WiFi … and now interactive projectors (with infrared pens) that turn any wall into a screen;

- Furniture that enables proper ergonomics and comfort when using laptops is important given their prolific use in education, particularly in the higher grades, and the challenge they pose in obtaining proper heights for both their screens and keyboards. The University of California at Berkeley's Ergonomics Program indicates that "the best place for a laptop is on the user's lap";

- Paul Erickson points to furniture that can store, move, charge and protect technology – such as portable laptop carts, utility carts with shelving, portable/storable tables with power and data ports and portable screens – and the importance of "integrating technology equipment with movable furniture".

- **Ergonomics and comfort**
  - Furniture designed to be ergonomically appropriate for users of varying sizes and proportions and favoring different learning styles; flexible, adjustable furniture with individual controls is often required to achieve this ;

  - Furniture designed to improve comfort and concentration for periods of extended use;

  - Research presented in the *Journal of Adolescent Health* indicates that poorly fitting furniture may cause musculoskeletal problems;

  - Chairs, tables and work surfaces not only at a good height for writing, but also for keyboard use which differs. Keyboard trays under desks and tables can help achieve this;

  - Chairs that adjust for student height, weight and task-at-hand, work surfaces with inclined tops (about 16 degrees, according to the University of Manitoba's guide to ergonomics) to improve back and neck posture as well as sofas, beanbags, fabric cubes and other cozy furniture for lounging and quiet reading;

  - Chairs and seats that allow proper alignment, side-to-side rocking capability for movement and swivel for easy entry and exit, and that can accommodate students of different sizes;

  - Desks and work surfaces at a height where monitors and laptop screens can both be properly viewed and looked over to see the teacher;

  - David Stewart recommends in his ASU article that chair selections come from a style series with different seat shell sizes and desks with adjustable height legs. For classrooms with older students, he recommends adjustable-height chairs with castors for accommodating students with different leg lengths;

  - Adjustable furniture is particularly useful in spaces used by multiple age groups such as computer labs;

  - Larger writing surfaces to accommodate materials needed for standardized testing (e.g., test booklets, answer sheets, calculators, laptops), since more of such testing is now required by schools;

  - Initially, ergonomic furniture cost 2 to 3 times the price of mainstream furniture, but cost savings are now being achieved by using less steel and plastic and are being passed on to buyers.

- **Health and safety**
  - Furniture made of materials that are non-toxic, non-irritant and non-carcinogenic (e.g., low VOC emissions) that do not negatively impact indoor air quality or human health, that meet or exceed environmental and air-quality standards, and that have been certified by independent sources such as the GREENGUARD Environmental Institute (GEI);

  - Furniture that can be cleaned and sanitized regularly since it typically has direct contact with multiple users;

  - Furniture that encourages student movement and physical activity. Research shows that students move around or fidget while seated in order to get to a state of concentration. Using exercise balls as seats, stand-up desks that can be adjusted for individual student heights and accompanied by adjustable-height stools, pneumatic tables, window seats, and other furniture that facilitate individual movement is beneficial for posture,

concentration, alertness and focus, physical health, obesity and individual work habits. Furniture located outdoors also helps encourage activity;

- To encourage more physical activity in the classroom, Amee Meghani suggests the use of chairs that are ergonomically designed to provide comfort and physical support and with foot rests so students can tap their feet as a way of expending energy and relieving restlessness. She also recommends desks, tables and workspaces that are lightweight and set on casters so they can be grouped and easily moved – in this way students get exercise both by moving them and doing activities in the open areas created when they are moved aside;

- Chairs made of soft plastic are more flexible and can move with the body. Task chairs designed to push users forward slightly also help with concentration. Desks with a bowed front (a "belly curve") let students move in close to their work;

- Color selection for furniture not only helps define a room's or space's purpose and visually delineate and unite spaces but also assists students with furniture adjustments (i.e., by color coding settings), adds sensory stimulation and impacts learning and health. Research reveals that color impacts emotion, attention, attitude, productivity, communication and learning. Color used in classrooms should stimulate participation and maximize information retention without over stimulating (younger students thrive in bright-colored environments). In libraries, color should suit the purpose of the space: reading areas with calm blues and greens, lounge areas with brighter colors. Color choice is wider in more relaxed common areas such as front entries and lunchrooms. With no set rules on color selection, it is best to let the purpose of the room or space guide the color scheme selection;

- Furniture that is designed with safety in mind and that functions with effective safety features, mechanisms and procedures in place; this is especially important with movable and adjustable furniture, which should also be lightweight;

- Furniture types and layouts that do not block fire and emergency exits.

- **Sustainability and durability**

  - Furniture that is sustainable across the product's lifecycle: materials → manufacturing process → distribution → product use → disposal:

    o Furniture using sustainable (e.g., sustainably grown wood products certified by the Forest Stewardship Council, FSC) and recycled (e.g., 100%-recycled polyester) materials, manufacturing processes and packaging;

    o Furniture built locally and transported a short distance;

    o Functional, durable and structurally-sound furniture that is long-lasting, can be reconfigured, refurbished or refinished for reuse, added to on an ongoing basis, and then recycled "cradle-to-cradle";

  - Furniture certifications by impartial, independent, third-party organizations for conforming to specific standards are the most credible (e.g., EcoLogo, GREENGUARD, Green Seal and UL Environment) and those addressing multiple attributes and environmental impacts (e.g., EcoLogo, Green Seal and UL Environment) across the product lifecycle are the most desirable for meeting sustainability objectives;

  - Meeting these criteria also supports green building certification (e.g., LEED);

  - Durability and reliability of furniture attained through solid construction, assurances through BIFMA testing and warrantees;

  - For durability, David Stewart recommends pieces made with high-pressure laminates, metals with baked-on powdercoat finishes, chairs with securely-fastened glides and heavy gauge steel legs, tables with securely-fastened bumper edges.

- **Procurement and value for money**
  - Furniture procurement process that takes into account educational goals, sustainability, design, budget, comfort, productivity and other 21st Century education goals;
  - Furniture procurement process that involves vendors, administrators, end users (teachers and students) and designers (architects and interior) from initial input to sampling to trial and end use to feedback stages; with architects assisting in bid review and selection to ensure furniture efficiency, flexibility, functionality and complementarity with building/space design and budget control;
  - Furniture that can endure the test of time both in wear and versatility, that can be refurbished cost-effectively (vs. buying new replacement furniture) and that has warrantee coverage;
  - Budgets that allocate sufficient funds for furniture, fixtures, and equipment (FFE).

CONSIDERATIONS FOR SPECIFIC SPACES

Considerations with regard to **furniture selection _for specific locations_** in 21st Century schools follow below.

Classrooms

As classrooms are the most predominant learning space in a school, the key considerations identified above for school furniture in general certainly apply to the classroom. Perhaps most paramount is _flexible_ furniture – through type, location and adjustment – that enables learning through teacher-directed instruction, individual or small- or large-group study and work, presentations, one-on-one instruction and discussion. Specific types and characteristics of furniture identified in the reference sources reviewed as well suited specifically for 21st Century _classrooms_ include:

- **Mobile tables and chairs** – Furniture configured in multiple ways and in different areas of the classroom to create desired settings for specific activities. Mobile tables of 30" x 60" or 36" x 72" suit small and large group discussion and presentation formats. Mobile tables meet the needs of project-based learning for the STEM (Science, Technology, Engineering and Mathematics) curriculum;

- **Mobile storage** – Units and systems on wheels that not only store materials but also permit flexible classroom configurations as well as provide mass for acoustical and visual separation of spaces and activities;

- **Ergonomics** – Furniture, especially chairs, that can adjust by position, height, angle and movement to accommodate users of different sizes and proportions and improve comfort for use over long periods of time;

- **Technology** – Furniture that can accommodate computers (anywhere from one to enough for all students in a classroom) and visual media;

- **Furniture systems** – That support and respond to the dynamic learning that takes place there;

- **Wall-mounted items** – Such as Smart Boards (projection technology and its relationship to the walls) and interactive wall coatings (white board and chalkboard paint).

Steelcase Inc.'s research and a presentation given by LS3P Associates at Work Session #3 on "Small School Furniture & Technology: Fundamentals of School Planning" point to the following key differences between traditional and 21st Century **classroom furniture selection and layouts**:

- **Traditional classrooms:**
  - Furniture layouts have desks facing a wall with fixed, stationary seats; seats are often connected to desks and can be interconnected with adjacent seats in a rigid formation;
  - Desks and chairs may provide some storage space for student use;
  - Chairs, desks and tables limit student movement – tablet arm desks, chairs and tables without casters, etc.;
  - The furniture selection and seating layout provide little flexibility for grouping;

- This layout promotes a passive education mode, built for lectures not collaborative or group learning;
- Technology and new media are poorly integrated or supported.

- **21st Century classrooms:**
  - Furniture layouts have a breakout area with soft seating, an activity zone and flex space;
  - The flex space permits quiet individual work, collaboration or presentation;
  - This layout can be reconfigured for flexible needs;
  - This layout supports multiple learning modes;
  - Chairs, desks and tables are flexible and mobile;
  - Writing and presentation surfaces are available on multiple walls and on furniture and storage units;
  - Teachers can use mobile work caddies to relocate where they need to work;
  - Potential learning areas are maximized with efficient moveable storage and teacher work spaces.

Science Classrooms/Labs

New ways of teaching science are leading to new classroom designs and furniture needs specific to science classrooms and labs, with additional differences between lower and upper grades. Hands-on instruction at the lower grades is creating need for science labs and science equipment in middle and K-5 schools. In contrast, most high school labs (except chemistry) are becoming more flexible. Common to all is the need to accommodate computers and other technology. Need for multi-use classrooms and budget constraints are also influencing science lab designs and furniture.

Notable differences by grade level include:

- **Elementary school**
  - Portable science demonstration carts with water reservoirs, sinks and a Bunsen burner operated only by the teacher;
  - Movable tables to locate around the room's perimeter or together in the middle of the room for science demonstrations.

- **Middle school**
  - More laboratory concepts but not full student workstations;
  - Movable tables with stools for two students to work together;
  - A demonstration table for the teacher, equipped with sink, water and gas;
  - Base cabinets and tall shelving along the perimeter for storing lab materials, samples and long term experiments;
  - Triple-track sliding marker boards to preserve information; even fume hoods set in the wall or built as an island.

- **High school**
  - Student workstations and pedestal stools, each for 4 students and able to configure in various ways;
  - Rectangular tabletops with built-in sinks and lower storage;
  - Small profile sink stands;
  - Fume hood stations;
  - Even emergency eyewash and shower.

As for technology:

- Computers creating line-of-sight issues can be accommodated on perimeter cabinetry, movable carts and work surfaces;

- New presentation equipment (e.g. LCD projectors) can be mounted on carts or suspended from ceilings and accompanied by conventional projection screens;
- They can project images from student computers and connect to DVDs, etc.

Art Rooms

- Tall tables and stools for working on art projects where standing is required to manipulate materials.

Learning environments beyond the classroom

Furniture is needed for a connected network of formal and informal learning spaces beyond the classroom, including:

- **Commons areas** – Mobile and easily reconfigured furniture that enhances opportunities for students to socialize, work or study and use their electronic devices concurrently;
- **Corridors and walkways** – Tables, chairs and whiteboards to foster continued student engagement spontaneously;
- **Near academic offices** – Tables, chairs and whiteboards to encourage collaborative learning and to support project work and extended interaction with teachers;
- **Stairwells, landings, nooks** – Inviting and comfortable seating to convert casual interactions into impromptu learning and community development opportunities;
- **Outdoors** – Furniture that invites students to go outside, in turn benefiting from nature, movement, physical activity, fresh air and sunlight.

Information/Media Centers *(aka libraries)*

School libraries and media centers are becoming "Learning Commons" and "Resource Centers". Their role and space needs are changing in response to the broadening of information sources provided, the demand for more space for collaborative study and work and the need for technology to be integrated throughout. So are their furniture needs.

Generally speaking, they require flexibility, variety and durability – in seating, tables and shelving – for multiple seating configurations and the ability to support technology:

- **Tables** – Flexible with the capability of using reference books, textbooks and computers when seated. An example includes modular tables that allow students to stay in one place – they lie flat for books and paper when the top is closed yet open up to provide a monitor for electronic research and writing;
- **Seats** – Flexible, mobile and durable, for a variety of settings and uses. Soft seating so it's inviting and creates a comfortable environment that encourages reading. Flexible seating (i.e., modular, stackable, light, armless) to easily reconfigure space for different functions. Café tables and chairs where social interaction is allowed and encouraged, to create a welcoming environment;
- **Shelving** – Freestanding shelving on casters for mobility – to make room for functions and define spaces. Merchandising and signage strategies from retail environments help students learn to make their own reading choices. These shelves cannot be too large or they will not be moved due to their weight;
- **Technology** – Deciding on types of computers and their space and furniture needs as well as approach to connectivity (ports, wireless) early in planning process. Integrated technology – media and computer equipment – is on the rise. There are also distance learning opportunities (especially in military schools) that can be supported by the information center - this requires more powerful computers than laptops and tablets. Parents' access to this is a way to connect to the community;
- **Durability** – Given the higher traffic and use, library furniture needs to be durable. For example, chairs with mortis and tendon joints and solid lumbar back posts, tables with end aprons and leg stretchers mounted with steel plates and mechanical fasteners.

In addition, they vary by sub-area within the resource center as follows:

- **Communal study area** – Furniture that is flexible and comfortable (e.g., modular), can permit collaboration and accommodate technology;

- **Resource center** – Furniture to permit resource specialists to assist students with resource use, especially new technology (e.g., interactive whiteboards), and furniture for small- and large-group meeting spaces. The resource area is also used to train teachers in new technology used throughout the school and info center;

- **Quiet reading area** – Comfortable seating;

- **Multi-use spaces** – Furniture that can accommodate a variety of uses, such as project work, multi-media and multi-classroom activities, book drives and science fairs. It is important to be able to fit a large amount of people in this space – flexible furniture is important because the information center is often used to gather faculty and staff for large meetings;

- **Specialist areas** – Designated areas for special needs and reading specialists;

- **Book shelves and displays** – Displays, mobile fixtures, signage and lighting to make books more attractive and visible and to be moved to create sitting areas for teaching. Also natural lighting is very important and makes reading more enjoyable and students are able to read longer in natural light.

A recent example of a library going book-less can be found on the upper school campus of Cushing Academy, an independent co-ed boarding school located in Massachusetts. Information about the library is available on its library website and in an SP&M article written by The S/L/A/M Collaborative (May 2010). The article describes many of the furniture selections made for the library.

School libraries and media centers located *in elementary schools* are evolving more slowly. They continue to be centrally located, filled with bookshelves and books and offering a few comfortable lounge chairs. This is because books remain the preferred medium for reading, instruction and study materials. It is also common for elementary school libraries to be accompanied by an adjoining computer room with sufficient hard seating for class instruction. This is because direct supervision by teachers remains the norm. However, for those that are becoming increasingly "Commons"-like or digital-embracing, the following furniture needs arise:

- **"Commons"** – Furniture for quiet individual reading areas and closely associated small group learning and multi-media spaces, for common areas where collaboration and self-directed exploration occur and for a small storytelling area where student presentations and performances can also be held;

- **Furniture to accommodate technology** – Furniture to use and store laptops, digital readers and other electronic devices; surfaces for flat screen TVs;

- **Furniture to accommodate after-school functions** – Such as after-school programs, faculty meetings and gatherings, and community events.

Peg Sullivan, of the Library Resources Group LLC, believes technology has not evolved enough for schools to eliminate books entirely. There are many physical forms of literature that encourage students to read, such as magazines, newspapers, and graphic novels. With a strictly digital library, these items may be left out. Younger students (up to third grade) are learning how to read and require physical books. After third grade, students begin to use reading to continue learning other subjects.

She adds that the circulation desk is becoming a thing of the past. Students are increasingly tech-savvy and can check books in and out by themselves. Younger children take pride is this responsibility. This frees the librarian's time to be more proactive in students' daily activities within the information center. Also, the circulation desk was a large piece of furniture that typically created a barrier between the adults and students in the library. Without a circulation desk, there is now a smaller, more informal 'information desk' which is more accessible and inviting to students.

Other functional areas

- **Cafeterias:**
  - Introduce a variety of spaces and seating types to encourage social interaction: high top tables, booths and lounge furniture;
  - Break up spaces with booth-like partial enclosures to encourage students to enjoy food as a connecting social activity and academic engagement beyond the classroom, rather than large institutional spaces that encourage overeating which can lead to obesity;
  - Provide WiFi access to permit access to information;
  - Fully functional kitchens with convection and steam ovens, rather than fryers, to make healthier food;
  - *"Cafetorium" or "auditoria"* – Flexible furniture for this merged, multi-purpose space - student dining and performances, evening banquets and community events – with round or oval tables favored by students and for banquets as they facilitate socialization;
- **Storage** – Common storage areas for excess tables and chairs.

NOTABLE DIFFERENCES BY GRADE LEVEL

DoDEA's work session # 3 included applying the guiding principles and neighborhood models into **building concept designs** for its 21st Century schools **according to school type or level**. The following distinct design goals are set out for each school type in its report:

- **Elementary school** – The design goal is to "provide a place for learning that is welcoming, comprehensible, transparent, sustainable, safe, connected to the outdoors and has at its heart: learning neighborhoods, information center and cafeteria" (K-5, pages 32-43 of DoDEA report);
- **Middle school** – The design goal is to "provide a nurturing and comfortable environment for each student … (with) a central 'heart' in the building … (that) includes the cafeteria, information center, commons and auditorium. The neighborhoods and commons paces radiate out from the open central 'heart'" (pages 44-51 of DoDEA report); and
- **High school** – The design goal is to "provide a collegiate ambience with a civic presence that is environmentally sensitive. The building should be zoned to separate public and private uses, but be centered around a commons area to be shared by all. The design should facilitate movement between the private neighborhoods. The facility should be flexible and adaptable for multiple uses, thus blurring the lines of traditional physical boundaries" (pages 52-61 of DoDEA report).

Elementary Schools

With LS3P's current focus for DoDEA on elementary schools, the following additional distinctions are noted:

- DoDEA elementary schools cover six grade levels and include a mix of K-5, K-2 and 3-5 facilities; a total K-5 school population of 600 students is typical;
- Neighborhoods are sized for the appropriate student : teacher ratios of 18:1 for K-2 and 25:1 for 3-5;
- Neighborhoods are welcoming to parents, guest speakers and educational partners;
- Unique elements and attributes impacting spaces in K-5 neighborhoods relate to appropriate scale, movement, socialization, disability services, full- and half-day schedules, basic/fundamental skills development, direct connection to outdoors, active learning, experiential learning, relationships, strong integration of music/art/movement, mentorship, parents and community, and self-development;

- Spaces are needed <u>within the Neighborhood</u> to accommodate general learning for groups of various sizes, multi-use/common space, independent and outdoor learning, storage and resources, home school/parents center, and special activities (e.g., the arts, physical, lab science);

- Functions that support the entire school (and general public outside of school periods) are accommodated in Core Spaces located <u>outside</u> the Neighborhood – Namely administration and reception, clinic, counseling and specialists, gym, information/media center and professional development;

- Additional distinctions are made between the K-2 and 3-5 grade levels, with the latter moving the following to Core Spaces <u>outside</u> the Neighborhood – Art and music/band, auditorium/theater, cafeteria, learning impaired, stage and wet labs.

The DoDEA/Jacobs report (page 76) includes a 21st Century Program of Requirements for each school and space type.

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NOTE: Follow hyperlinks to access sources directly.

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- – "Team Building in Class" (Mira Korber, October 2011)
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