WHAT'S IMPORTANT IN THE PLANNING AND DESIGN OF LEARNING ENVIRONMENTS:

THE BUILT ENVIRONMENT AS A CATALYST FOR STUDENT SUCCESS

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INTRODUCTION

The national push for increased student performance continues as our nation's school buildings deteriorate and increasing numbers of children are surrounded by inadequate facilities. As the nation is focusing on reversing trends of slumping student success, there is a simultaneous growing body of research linking student achievement with physical school environments. The result is that the concern over the deteriorating condition of American schools is reaching an urgent status. The combination of aging buildings, rising enrollments and decreasing or stagnant financial resources are creating heightened challenges to our aspirations for student success. Finding ways to allocate often scarce resources to strategies that reap the highest educational value is a critical component of our state and national agendas.

Schools can have four times the number of occupants per square-foot as office buildings, yet until now, more focus has been given to environmental factors that affect occupant productivity in office environments than in educational ones. Children spend up to 30% of their time in school environments, yet more focus is given to the positive effects of environments in short-term healthcare facilities than in schools.

Fortunately, those times are changing. Recent studies regarding differences in student performance based on building condition have focused on many factors of facility quality, such as air quality, occupant comfort, aesthetics, daylighting and acoustics. A study of schools in Orange County, California showed the importance of daylighting in classrooms. Completed in 2002, the study shows that students in classrooms with windows or skylights scored 19 to 26 points higher on standardized tests than their peers whose classrooms had little or no natural lighting. Building age can also be a factor. Complications more prevalent in older buildings have been found to actually cause loss of instructional time as well as absenteeism in both students and staff.

Perhaps more important than physical condition, buildings can become obsolete even if they are technical sound because they fail to accommodate innovations in curriculum development, instructional strategies and content development. With the growth of brain-based research in the 21st century beginning to illuminate connections between learning and external stimuli, comes compelling evidence that the school environment impacts student achievement, behavior, attendance, and teacher retention. The brain is a physiological system which can be stimulated, both positively and negatively, by its physical surroundings. In

short, there is an increasing conflict between our aspirations for our nation's children and the facilities we currently offer them.

It is important to also focus on how school facilities encourage students to be academically successful. According to a study by T. C. Chan entitled "Environmental Impact on Student Learning", student achievement is highest in modern learning environments and lowest in obsolete learning environments. Dr. Chan concluded that technologies and adaptabilities of modern environments better equipped students for success. Studies of exemplary schools are finding that adequate physical conditions contribute to higher teacher attendance, morale and can reduce teacher turnover. Teachers with higher job satisfaction do a better job of educating children.

Children by their nature are passionate, creative, open to new ideas, and full of energy to discover the world around them. During their PK-12 school experiences, 21st century learners should have opportunities to experience:

- Curriculum based on real-world relevance that is tailored to each learner and designed to optimize their success.

- School Organization that allows for flexibility of time and space addressing teacher as well as student needs.

- Technology that is supportive of individual learning and teaching styles and ubiquitous within the learning environment.

- Community Outreach that promotes collaboration, encourages life-long learning, and is mutually beneficial.

Responsive school environments aren't rigidly defined by square-footage or construction budgets; more importantly, they make thoughtful connections between learning and facilities. As schools strive to improve student performance, they must accurately assess their needs as a holistic instructional entity. These needs must then be reflected in the planning and design of instructional space. Schools which focus on the learning needs of their students and the research supporting effective teaching are better equipped to avoid obsolescence and achieve student success.

EMBRACING CHANGE

"When you're finished changing, you're finished." - Benjamin Franklin

Ben Franklin may not have been an educator by trade, but his words echo today more than ever before. Today's students have needs and expectations that differ from those of students even 10 years ago. Today's students are more active participants in their learning, which implies unprecedented shifts in curriculum, teaching methodologies, educational technologies, and learning activities. Educators continue to debate over how to improve education in the United States without adequate attention to the design and condition of school buildings. The average age of public school buildings in the United States is over 40 years old, and growing older each year. Schools designed even 20 or more years ago are not likely to fit with the widening range of student and teacher needs of today.

A recent publication by the Council of the Great City Schools entitled "Reversing the Cycle of Deterioration in the Nation's Public Schools" concludes that it is extremely difficult to raise levels of academic achievement when teaching and learning take place in crumbling, antiquated facilities. Additional studies have concluded that students in substandard school buildings perform at lower levels than students in newer, functional buildings. Researchers have found that students in deteriorating school buildings score between 5 and 11 percent lower on standardized achievement tests than their peers in modern buildings. Some experts believe that these negative impacts may be cumulative for some students the longer the students attend a deteriorating school. One issue which many experts agree upon is that poor quality environments affect morale for both students and teachers. These buildings are also less likely to be visited by parents and community members, which also contradicts the compelling evidence that parental involvement in a child's schooling has positive impacts on the child's achievement.

Recognizing the growing body of research linking facilities and student performance, in the face of challenges such as those noted above, the urgency for action is becoming increasingly apparent. Once the recognition of the urgency of the situation becomes widespread, stakeholders become increasingly open to change. In short, positive change follows adversity.

Embracing change is a key element of avoiding obsolescence. Those who cannot embrace change attempt to impose constancy on a universe in motion. This adversity to change has resulted in many examples of obsolete educational facilities in use today. Asking teachers to participate in the planning and design of classrooms is a solid start, however asking them to redefine their needs for effective teaching and then envisioning spaces which can support their visions will no doubt result in more responsive environments for teaching and learning. But true change requires risk.

"If you always do what you've always done, you'll always get what you've always got."
(- attributed to both Henry Ford and Mark Twain).

In the planning and design of schools for 21st century learners, the questions must be reframed and the answers are expected make us adults uneasy. Just imagine if Mr. Ford focused his efforts on developing a more efficient horse or creating a mechanical manure collector instead of re-thinking the question of personal transportation from the inside out. We simply cannot afford to continue building and rebuilding school facilities using the same strategies implemented in school buildings over 100 years ago. The urgency is underscored in the state and national statistics on student performance, drop-out rates, and incidents of juvenile incarcerations. Student success in the 21st century will be difficult - if not impossible - to achieve if schools continue to be 20th century models.

As our national conversation on education focuses on "21st century learning", we approach the second half of the second decade of the 21st century. We are behind. The time to embrace change is upon us.

NEXT-GENERATION TEACHING AND LEARNING

The definition for 21st Century Skills vary widely, however the root attributes required of citizens today include collaboration, creativity, communication, and critical thinking. Schools that aim for student mastery of these skills provide rigorous project-based learning, social-emotional learning, and ubiquitous access to technology. These schools are places where innovation is the rule, not the exception; where students become lifelong learners and continuously develop themselves as responsible, creative and productive 21st-century citizens.

Research on the brain illustrates that no two brains are alike. No two individuals learn in the exact same way, nor do they bring the same experiences and prior knowledge to interpretations and understandings of new ideas. Scientifically, learning is the stimulation and growth of neural synapses. While research illuminates varying insights, what is generally known as quality learning includes the following elements:

- Personalization – the way we learn is as unique as our fingerprint.

- Differentiation – bringing unique prior knowledge to a task means that individuals require equally unique levels of challenge, pace, context and content.

- Socialization – brains work more effectively in concert with other brains.

- Authentic Context – interactions with the physical world create more powerful understanding than learning removed from context.

- Self-direction – powerful learning occurs more consistently when students imitate, direct or otherwise play a role in their learning.

- Holistic learning – powerful learning engages the body, mind and spirit of the learner.

- Environmental Stimulation – various attributes of the physical environment affect a child's learning process, either positively or negatively.

In response, principles that should guide the planning and design of 21st century schools must recognize the holistic educational institution as more than a quantitative measure of scores and statistics, but instead address the qualitative attributes which should be inherent in our nation's schools:

Relationships are a cornerstone of academic achievement.

Meaningful relationships, effective communication and collaboration among and between students, their families, and staff create high achievement, satisfaction and productivity. Positive teacher-student relationships draw students into the process of learning and promote their desire to learn. Each student should be connected to responsible, approachable and caring adult advocates. Student anonymity has no place in the school.

Relevance motivates students to pursue understanding.

Relevance is a key motivator, connecting students to understanding and knowledge. Curricular strategies that integrate theoretical, conceptual and practical knowledge from various fields of study provide authentic, real-world relevance.

Diverse student interests and abilities must be celebrated.

The educational environment should support the skills, interests and abilities of all students. In addition to core and elective programs, activities, clubs, athletics and the like offer multiple venues to develop and celebrate student individuality and creativity. The school should be a creative and enterprising expression celebrating the power of all styles of learning.

Proven practices are embraced, and both rigor and innovation are expected.

Exploring and sharing proven and innovative practices for teaching and learning allow for growth and continuous improvement. All aspects of our educational system will empower rigorous and adaptable, innovative, and future-oriented practices so that current and future graduating students will have the skills to thrive in a changing, multi-dimensional, global and technological society.

Environmental stewardship promotes global citizenship.

Empower children to view the world critically, to think and act independently, cooperatively and responsibly. We believe that a sustainable environment promotes global citizenship and awareness, and connects students to their world.

Human, physical and financial responsibility fosters community support.

Resources should be used effectively and efficiently to ensure the community a measurable return on its investment, and to cultivate and maintain a culture of accountability, trust and mutual support.

A safe, healthy and nurturing environment meets holistic needs of learners.

Student learning increases when the school climate is safe, healthy, supportive, and trusting. Such an environment promotes innovation, inquiry, and productive risk taking, indirectly reinforcing achievement because both students and educators want to work under such conditions - without the distractions caused by fear, judgment, poor air quality, temperature swings, and inadequate lighting.

Learning extends past the bell schedule and beyond the school campus.

The school and community share in the responsibility for achieving student success. Relationships with outside organizations, institutions, individuals, and the great outdoors support and strengthen educational programs. We believe in students as both teachers and mentors, and we have high expectations for a culture of collaboration.

Technology is a powerful tool for teaching & learning.

Technology is one of many tools for teaching and learning. The use of technology is driven by the task and the student, and should not be seen as a replacement for all other tools.

As a tool, technology can enable a community where learning is available for everyone, at any time, and in any place

Choice is a foundation of student-centered learning.

Student-centered learning allows for each student's skills, interests and abilities to be aligned with their individualized strategy for academic success. Providing students with choices increases student interest, engagement, and learning while helping to build 21st century skills such as critical thinking, self-regulation and adaptability.

The school is an important hub of community activity.

Family and community engagement is a vital part of a truly successful school. The high school should be a source of community pride, open to wider use, and a mutually-beneficial bridge to the local community.

In combination, the elements of brain-based learning, the structure of the school organization, and the principles upon which school facilities should be planned and designed must be in alignment. In response, educators and architects alike are beginning to offer courageous ideas and insights in the planning and design of educational facilities by exploring the question: **"What would it look like of we truly meant it?"** In other words, since we now understand so much more about the brain and learning, how should spaces be designed in response?

HIGH IMPACT ENVIRONMENTS

Many if not most American schools were built in a time when direct instruction was believed to be the most effective educational practice. These buildings were planned and designed for educating youth in an era of industrial growth and factory-style efficiency. Accommodations for differently-abled children were scarce, and schools often had a filtering role to distinguish among children who would make good leaders and those whose skills would be better applied to laborer jobs. The criteria for making such distinctions were relatively narrow, ensuring that only a select few students achieved the academic success to propel them into college and career success. Differences in skills, abilities and interests among students was minimized in exchange for the value of conformity. Not surprisingly, school facilities designed and built to support this approach resembled factories where the cellular regularity of identical classrooms offered little stimulation of imagination, support of creativity, or recognition of varied learning styles. These facilities were not built to promote academic success of all students, but instead were effective environments for only a select few learners.

Much has changed since then. What we know about learning has dramatically increased in recent years. Research on aspects of learning such as social, physiological and neurological functions have pointed to more holistic perspectives of human learning and development. Learning environments that better align with current findings on brain-based learning can offer their students, teachers, parents and communities much more than traditional direct-instruction pedagogy.

Examples of such modern learning environments being built around the world today are growing in number, allowing for increasing studies of their efficacy in positively impacting student achievement. Many of these new environments accommodate a range of teaching and learning styles, support individualized instruction and strengths-based teaching, include ubiquitous technology, and are adaptable to support varying degrees of change over time.

Key characteristics found to have positive impacts include:

- Flexibility – Facilities should be able to adapt to various functions, activities and student groupings, both over the life of the building as well as during the course of a school day.

- Transparency – Facilities should allow for sharing, observation and interactions among students and adults.

- Choice & Differentiation – Schools that address student differences instead of focusing on their similarities include a variety of space types from which a student can choose. Students should be able to select an environment that suits the task or activity at hand.

- Access to resources – Facilities should be designed to allow students to follow their interests. Resources to assist both students and teachers should be readily accessible.

- Encourage Positive Relationships – Students respond positively when they know someone cares. Environments should be designed so that various opportunities for interactions among teachers and students are commonplace.

- Stimulation – Learning can be defined as the stimulation of neural synapses in the brain. Environments should include stimulating elements such as color, shape, vertical articulation, artwork, flexible furniture, etc. which have been shown to stimulate brain activity in positive ways.

- Clear Wayfinding – Chaotic networks of rooms and hallways can cause disorientation and frustration. Students and visitors alike feel more comfortable and confident when they can easily find their way through a school or campus setting.

- Comfort – Comfort can include a multitude of physical parameters including air quality, temperature and movement, lighting, acoustics, thermal control, etc. Distraction, fatigue and even sickness can result from buildings where these systems are out of balance.

- Community Engagement – When a school is the center of its community, the circle of stakeholders widens and mutual benefits are achieved. The school must be welcoming and accessible to its wider community. "It Takes a Village."

OUR HIGH IMPACT PROCESS

The challenges to achieving the high-performance status of the educational institution may seem insurmountable. The following steps are offered as a guide to assist schools in planning high impact learning environments for their students and communities.

THE KEY TO HIGH IMPACT ENVIRONMENTS: VISIONING

The development of any strategy for addressing facilities must begin with an understanding of the educational vision, including goals, strategies and projected future needs, that each individual facility is intended to support.

In short, a strong educational vision will serve to inform the proposed facility planning strategies, promoting close alignment of the educational vision with the physical facilities for each site.

The process should explore multiple interrelated educational components such as:
- Curriculum goals & delivery models
- Technology goals
- Flexibility goals
- PK-12 continuity & program alignment
- Special programs (SpEd, IB, etc.)
- Community & after-hours use
- Partnership opportunities
- Projected future needs

A strong educational vision can be translated into the criteria used to help define the characteristics of the school facilities which are intended to support that vision. Criteria typically include spatial parameters such as school size and capacity, grade configurations, space types, technology, flexibility, extended use guidelines, spatial relationships and hierarchies, and the like.

With criteria developed directly from the educational vision, you have built-in assurance that decisions related to facilities are made with the best interest of the student in mind. Educational planning is essential to developing a coordinated, thoughtful, responsive and effective facilities plan that will serve the state, district, school and students well into the future.

The following process includes suggested methodology for educational visioning. It is expected that the process will be adjusted and fine-tuned to best meet the unique needs of each school community.

The suggested methodology is organized into the following activity categories:

DISCOVERY -   Understanding context & "givens"

VISIONING -   Establishing the "Big Idea" for education in both the school system and the individual schools

SYNTHESIS - Translating Guiding Principles into ideas and strategies for facilities (educational specifications)

PLANNING - Developing the best course of action & applying it to a real project (conceptual planning)

DESIGN - Following through with implementation as the project progresses into design phases

Note that these activities are quite interrelated and often occur simultaneously and/or with substantial overlap. In addition, varying degrees of stakeholder participation are expected. The extent of involvement desired by Leadership, stakeholders should be discussed and outlined more specifically tailored during an initial process and site-based strategy sessions.

DISCOVERY Understanding project context & "givens"

This is an information-digesting time during which familiarity with the specific context and existing parameters of the school system and its schools is gained.

Below a list of information to facilitate the understanding of the current conditions, practices, delivery methodologies, and educational goals existing in the school facilities. This information serves as the "jumping-off" point for visioning and synthesis processes as outlined below. Additional information may be required to support planning and design phases.

Information needed from each school falls into two basic categories: Aspirations and Current Practices.

Aspirations such as:
- Mission, Vision, and Goals
- Strategic Plan
- Educational Philosophy & Initiatives
- Technology vision and goals
- Environmental/sustainability goals
- Parent and/or community survey results (suggestions & requests)
- Local Employment trends and projections

Current Practices such as:
- School configuration (grades, school size, class size, teacher ratios, etc.)
- Curriculum delivery methods (core, specialties/electives, sp ed, CTE, etc.)
- Attendance Procedures (boundaries, feeder systems, transportation, etc.)
- Demographics & enrollments (historic, current, projected)
- Student and Related Services (offerings, locations, enrollments, etc.)
- Alternative educational systems (on-line, off-site, specialty schools, etc.)
- Community Partnerships & Programs, including after-hours use of facilities
- Ongoing and recently completed studies and/or committee reports
- School facility data including acreage, age, size, enrollment, staff, etc.
- School facility use(s) including floor plans with current room uses indicated
- School schedules, including time, class sizes, room utilizations, etc.
- Staff development, mentoring and/or continuing education plan
- Learning assessment summaries and graduation rates
- Safety, security and emergency plans

- Photographs of each school:
  At least 1 exterior photograph
  Interior photo of main office/reception
  Library/Media Center
  Classrooms by type (i.e. kinder, science, special ed, etc.)
  Specialty spaces (art, music, CTE, etc.)
  Community facilities (gym, MPR, etc.)
  Aerial photo of the school site

VISIONING   Establishing the "Big Idea" for education in the school (Guiding Principles)

School clients and their architectural teams often think of programming and planning as establishing the tangible and quantifiable goals for the project. While this is a key part of the process, the most important element is often left out. That element is visioning. The stronger and more persuasive the vision for educational facilities - the more power the team will have to attain each goal throughout the project's development.

The vision process can be organized in many ways, depending on the specific project parameters, however visioning typically begins with an exploration of possibilities without much regard for general physical constraints. When anything is possible, the discussion can focus on what is best for teaching and learning. During the visioning process, many stakeholder voices are solicited and heard. Precedents and best practices from throughout the world are reviewed. Local successes and challenges are also explored.

The ideas and insights from these visioning sessions are synthesized into a set of guiding principles which will be instrumental in keeping both quantitative and qualitative aspects of the project on track. The team must know how requests for physical space fit into the larger scheme of things. What does it mean to the school and its stakeholders (students, parents, staff, community, etc.)? What is the core motivation? All further issues, ideas and decisions can then be evaluated on their ability to support these principles. Communication and engagement are core to the process. At the completion of the project, when teachers and students are using their spaces, the guiding principles become the measure of a job well done.

SYNTHESIS   Translating the Guiding Principles into ideas for facilities (educational specifications)

This activity begins with the Guiding Principles for school facilities, and results in possible responses to the question "What would it look like if we really meant it?" for each Principle. The deliverable includes the established Guiding Principles and a variety of potential directions upon which the school may choose to act. Through this synthesis phase, confidence in the school's direction as well as the design team's ability to follow through is established.

The educational specification deliverable synthesies multiple perspectives and design parameters, both quantitative and qualitative, including:
- Executive Summary
- Unique Learner Characteristics & Needs
- Academic expectations, visions & goals
- Guiding Principles

- Critical Issues (such as security, parental involvement, community engagement, health & safety, home/family, adult/student relationships, life-long learning, and other issues arising from stakeholder discussions)
- Technology guidelines
- Design considerations (daylighting, sustainability, flexibility, aesthetics, etc.)
- Site/Exterior Areas and Issues
- Program Areas and square-footage summaries
- Spatial Attributes (furniture, lighting, services, finishes, etc.)
- Spatial Relationships and Adjacencies
- Additional Space Requirements & Resources (staff development, support, alliances, sponsorships, community programs, etc.)
- Appendix – include process documents and references such as notes from community meetings, surveys, presentations, etc.

Completed using a comprehensive, inclusive and collaborative process, educational specifications represent a valuable documentation of the physical guidelines for the design of the school. Ed Specs can also become a useful tool in teacher training on how to use the new environments to achieve maximum educational value.

At the completion of the synthesis activities, it is important to identify "next steps" the design team should take to ensure the ideas and strategies discussed will be applied to positively affect the planning and design of school facilities.

PLANNING

During the conceptual design process, information generated during the visioning process is translated into conceptual designs and floor plans that uniquely address the stated needs and that begin to consider the realities of site and construction parameters.

To strengthen this step of the process, it is important to engage the school communities (students, parents, teachers, administrators, staff, community members, etc.) in additional interactive workshops, often referred to as pre-design charettes. Participants will review the goals, learn from examples of outstanding learning environments (physical and/or virtual tours), discuss the potential impacts of future educational strategies, technology and workforce trends of the school and community, and brainstorm ideas and options. The pre-design charette is a method to facilitate and focus conversations so that the best collective priorities positively influence the final design.

Collaborating with the architectural and engineering teams in this activity in an important step to ensure that the resulting design is an accurate translation of the educational vision. The resulting conceptual design will truly reflect the school system's commitment to students and the vision of the wider school community. Conducting these charette workshops is also a good strategy for generating community awareness and support for the project.

DESIGN

As the project moves from the visioning and pre-design phases, our team can provide tangible and lasting benefits by ensuring that the design team follows through with the development and delivery of a facility that meets the established goals and principles. Since the pre-design phase of the project development includes conceptual planning only, many of the decisions that most affect the educational atmosphere are only loosely defined. During design

development, the physical characteristics of the building and site are developed with increasing detail. We ensure that best practices and latest thinking in the design of educational environments are considered and incorporated as appropriate, from flexibility and educational systems down to the very last details such as color, materials, graphics and furniture. Thoughtful and accurate incorporation of all elements of the educational environment are critical to the ultimate success of the finished product.

The process should be participatory, as student, staff and community involvement generate great value during the process and help ensure a successful outcome. Mutual benefits must be emphasized, and support should be solicited in a variety of venues and formats. Once these critical stakeholders are engaged, it is expected that they will continue to inform the direction of the project with knowledge and enthusiasm as it progresses to subsequent phases of design and implementation.

The stakeholder groups should be adequately represented to collaborate in the definition of both specific and integrated needs such as:

Student Needs such as:
- Recognize the unique developmental needs of students to be served
- Understand the specific demographics of the designated student body
- Overlay the additional challenges unique to students within area
- Include considerations for specific programs and special needs

School Needs such as:
- Attributes of a school to support student learning & community needs
- Community resources that can support the new school
- Planning to allow the facility to evolve in alignment with changing needs

Community Needs such as:
- Explore community issues and concerns
- Recognize mutual benefits
- Explore arts & cultural connections

State/District Needs such as:
- Provide learning environments that truly support 21st century learning
- Provide equitable opportunities for all students
- Provide safe, efficient and effective facilities throughout all schools

A site-based "steering committee" should be convened to provide leadership and direction during the visioning process. Additional input, direction, review and decision making will be structured in a variety of ways, typically facilitated by a consultant in collaboration with the architectural team. At various meetings, activities and work sessions, groups are engaged singly and in multiples. Workshops are "open-invitation" sessions conducted to include the insights, comments and questions of stakeholders and interested parties.

Engaging students in the process can reap huge rewards for the visioning, planning and design processes. With student participation, adults can more fully understand learning and environments from the "clients" perspectives. Offer hands-on student activities that engage

students to think about their schools, brainstorm the characteristics of optimal environments, and share their insights for learning in the future.

SUMMARY

We must understand the need to support creative school leadership and teachers who see themselves as collaborators in designing a new type of learning environment that is more flexible, demanding and challenging. The goal is to seek and find new ways to capture all of this positive energy, and to make sure that the students and teachers themselves are part of both the process and the solution. The process should result in strategies for prioritizing decisions and for allocating resources to those actions that are most likely to yield the maximum educational value. While thoughtfully designed space is not the only answer in the quest for enhancing student success, it can play a key role in enabling 21st century teaching and learning. Facilities matter.