# R+B

## RESEARCH AND BENCHMARKING

## Connected

Insights and ideas on
how buildings, and
designs for them, can
support and improve
our lives

Stantec

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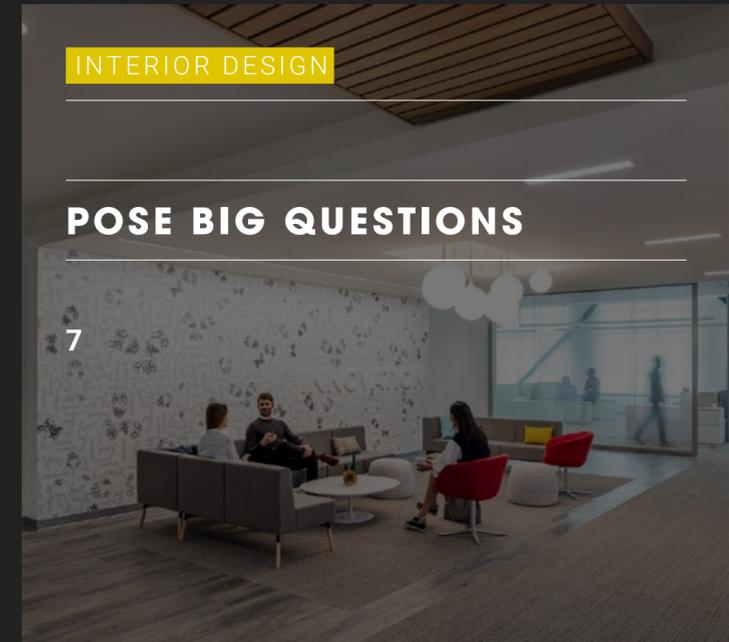
# Connected

Research and benchmarking in design is about making connections. In this issue, we look at our R+B process as a vehicle for connection.

## BY LAURA FLANNERY SACHTLEBEN

*Laura is the Global Education and S&T Leader at Stantec, and also leads the R+B Program.*

**University of Manitoba – Stanley Pauley Engineering Building**
*Winnipeg, Manitoba*

ONNECTIONS ARE AT THE CORE OF OUR EXISTENCE AND OUR ABILITY TO THRIVE. WE CONTINUOUSLY, SOMETIMES UNCONSCIOUSLY, SEEK MEANINGFUL CONNECTIONS TO OUR FAMILY, FRIENDS, COMMUNITY, AND THE ENVIRONMENT AROUND US. AS DESIGN PROFESSIONALS, WE MUST ACKNOWLEDGE THAT OUR WORK CAN HAVE A PROFOUND INFLUENCE ON THE ABILITY OF END USERS TO CONNECT TO THE SPACES WE CREATE.

**R+B keeps us connected to the outcomes of our work.**
By connecting with our work as occupied and used by clients, we get invaluable information that we can take back to the drawing board. This helps us discover the way conventional wisdom or design trends play out. Evaluating our previous work as a part of our regular process helps us finetune our design solutions.

**It connects our design teams to the issues our clients are facing.**
Throughout our R+B efforts, we're looking for the ways that design connects with people, and how occupants use the spaces intended for them. We offer a counterpoint to the idea of a building as a static object. Rather, as designers we create spaces around human activity, and our research evaluates how spaces enhance (or inhibit) those human activities over time.

**It connects us to design solutions and strategies.**
In the R+B Program, we survey and take inventory of approaches to space and human activity. One of our jobs is to help our clients solve or even avoid issues that may not yet be on their radar and offer solutions they would not have otherwise considered. If we are thoughtful, we create spaces that are customized and support diverse people across a range of activities.

Each article in this issue is about connection.

**Connecting young learners to their educational environments**
Research shows that children thrive when they connect to the places in which they learn. How can design facilitate their path toward education? We examine a variety of approaches that incorporate research findings on learning outdoors and in nature as well as environments that offer self-directed learning. **>**

R+B

*Change is the only constant in our communities today. Research enables us as designers to keep pace with and sometimes even anticipate the changing needs of a dynamic society. The better we can connect with our users, our built work, and the needs of our communities, the better we can design for tomorrow.*

### Connecting professionals to academia through a research partnership

The issues we face as a society move in and out of our buildings every day. Our research is about connecting design to community needs. So, we're deepening our connections with academia through a research partnership with Lawrence Technological University to study one of the most pressing design concerns of our era, the hybrid work environment.

### Connecting libraries with the needs of their community

In many of today's libraries you will find fewer books. In "Experiments in Found Space" we look at how libraries are repurposing newly available free space for a variety of uses as a way of connecting with the needs of their communities.

### Connecting health science education with real world methodologies

Our society's approach to healthcare is changing—hospitals are building holistic care teams around patient needs, for example. Forward-thinking health education institutions understand that they must change the way they teach while getting the most out of their spaces to provide value to students in a competitive marketplace. Health sciences educators want environments that connect with their students and their professional needs.

### Connecting experts to a complex building process

Buildings are becoming more complex with smart systems for example that can reduce their energy appetites. The process of designing and building today's buildings is similarly complex. To make buildings better and fully realize the power of smart and efficient systems, however, we need a new framework for understanding the building process. ■

# Creating connections for early learners

How we design learning experiences for our children to succeed

*BY DIEGO BARRERA*

*Diego is a Principal and Architect with 15 years of experience in educational facility design.*

**Grand Rapids Community College, Phyllis Fratzke Early Childhood Learning Laboratory**
*Grand Rapids, Michigan*

research tells us that the connections children make in their early education have an impact later in their lives. The data shows that children with access to high-quality Pre-K programs have higher academic outcomes later in school. Early childhood education programs have the potential for setting a child on a path to long-term academic success; however, we know that access to early education is not enough. The environments we design for children play a major role in fulfilling that potential and realizing lifelong impacts in the lives of young learners.

Research shows that high-quality early education benefits students. So, what makes a program "high quality"? How can the environment help achieve that standard? Let us explore how the environment can be a positive influence in student success.

The National Institute of Early Education Research (NIEER) provides benchmarks for high quality Pre-K that focus on teacher development, appropriate student-to-teacher ratios (1 teacher for every 10 students), and a rich curriculum that addresses the comprehensive Early Learning & Development Standards (ELDS). These standards concentrate on five domains[1]:

1. Physical well-being and motor development
2. Social/emotional development
3. Approaches to learning
4. Language development
5. Cognition and general knowledge

Research by the Brookings Institution, published in its 2016 report,[2] supports this focus on curriculum, highlighting "a well implemented, evidence-based curriculum" as a key factor for effective Pre-K programs. **>**

1.  *Overview of Changes to NIEER Quality Standards Benchmarks. National Institute for Early Education Research. Retrieved from https://nieer.org/wp-content/uploads/2017/10/Overview-of-Changes-to-NIEER-Quality-Standards-Benchmarks.pdf*

2.  *Phillips, D., Lipsey, M., Dodge, K., Haskins, R., Bassok, D., Burchinal, M., Duncan, G., Dynarski, M., Weiland, C. (2017, April 17). Puzzling it out: The current state of scientific knowledge on pre-kindergarten effects. Brookings. Retrieved from https://www.brookings.edu/research/puzzling-it-out-the-current-state-of-scientific-knowledge-on-pre-kindergarten-effects/.*

3.  *Ritchie, Sharon et al. (2009) First School Learning Environments: Supporting Relationships. Issues in PreK–3rd Education, Number Three. Page 3.*

**St. Andrew's Episcopal School**
*Austin, Texas*

High-quality early education comes in many forms. There is rich diversity in how early learners are educated—from programs that immerse students in nature, to programs that focus on social-emotional skills, to others that promote student-led exploration. There is also a trend towards providing young learners with spaces that promote positive interaction, greater access to the outdoors, and more opportunities to explore. These diverse learning strategies can be supported by learning environment designs that enhance student opportunities and support a high-quality educational experience.

**Choice and voice**
A successful learning environment encourages opportunities for learning in various ways, promotes health and wellness, and provides a wide range of possibilities for its users. Thoughtful building design can promote respect for learning and a sense of belonging, ownership, and pride for all members of the school community.[3] Often, we find that the best ideas for creating a place that fosters learning come from the community itself.

Community and student input help our team create a welcoming place for learning. Young learners feel comfortable in these environments because they reflect their culture and provide choices for shaping their own spaces, sparking interaction and positive exchange.

*The environments we design for children play a major role in fulfilling that potential and realizing lifelong impacts in the lives of young learners.*

St. Andrew's Kindergarten in Austin, Texas is a great example of how the design team, working closely with the school community, created spaces that reflect school and community values. Our design process focused on collaboration with stakeholders to develop a common vision and sense of community which **>**
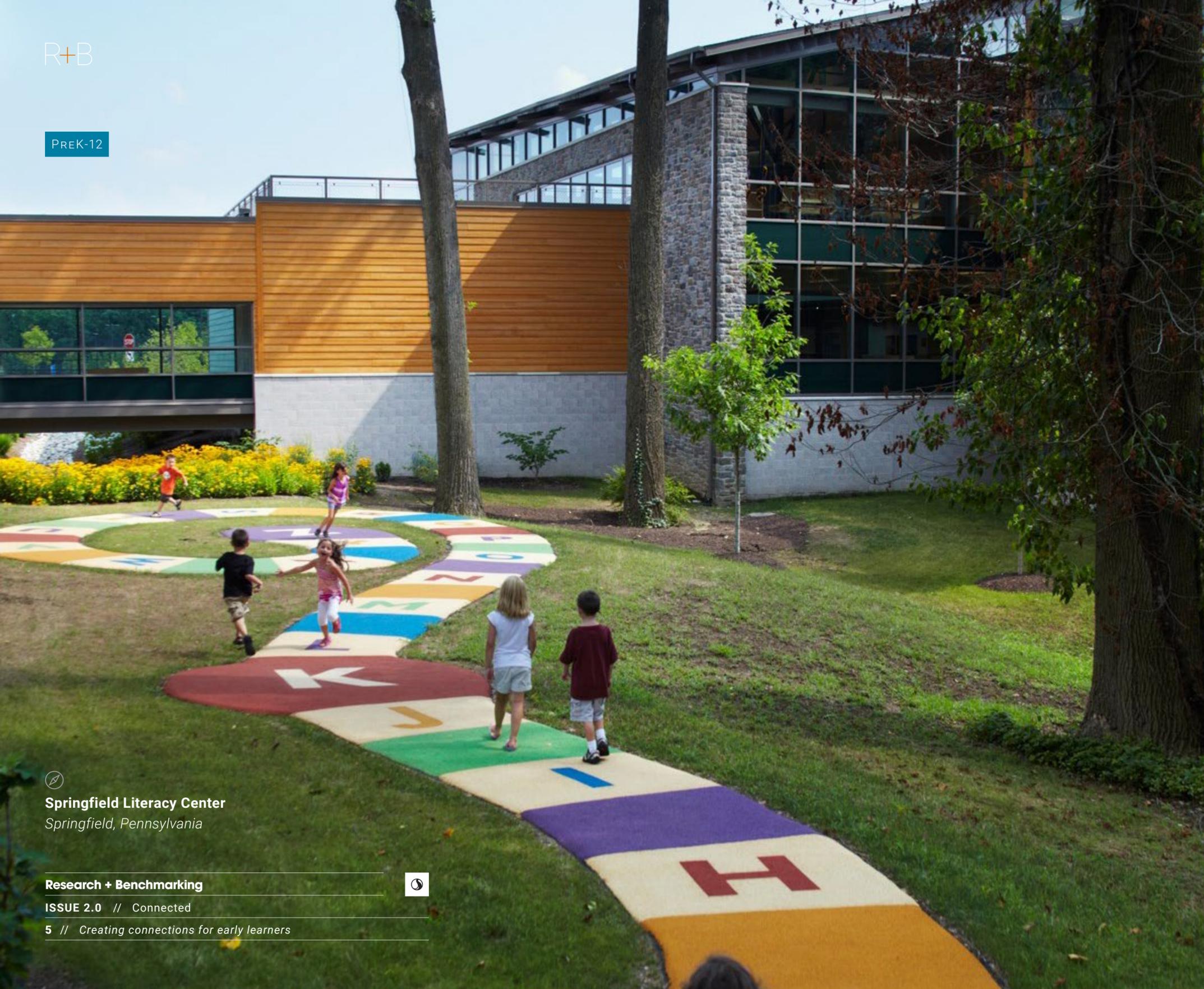
Springfield Literacy Center
*Springfield, Pennsylvania*

shaped the design of St. Andrew's Kindergarten. Within the design, flexible learning spaces allow students to customize their space for their individual needs. We carefully planned display areas to accommodate student work, further promoting a sense of pride and ownership. Additionally, our design team created space for the community to gather and share work. Breakout space by the entry can accommodate parent and community meetings and the large display wall has space for parents and the community to use.

## Children who have access to high-quality Pre-K programs have higher academic outcomes later in school.

**The great outdoors**
Data shows that learning outdoors, surrounded by nature, reduces stress, promotes activity, and helps students focus. We designed the Springfield Literacy Center in Springfield, PA with these ideas in

mind. The outdoor space features plants and vegetation that provide tactile and sensory experiences for students allowing them to explore and learn while they play and connect with nature. Our design team was inspired by studies that show movement and physical activity assist students' learning and retention. We used this idea to create the alphabet walk which encourages students to practice their ABCs while engaging in a modified version of hopscotch.

We can bring the outdoors indoors. For the Child Development and Learning Lab, designed as part of the College of Education and Human Services for Central Michigan University, our design team aimed for a strong indoor-outdoor connection. By incorporating tall windows looking into an outdoor Learning Garden, the design offers a high level of transparency and natural light to the interior spaces while providing a direct outside connection.

**Curiosity and exploration**
Many Pre-K schools embrace the principle of a prepared environment to facilitate student exploration >

*Early childhood education propels students to succeed later in life, and a well-designed Pre-K facility offers a place for that learning to start.*

and independent learning. For the Early Learning Laboratory in Grand Rapids Community College, our goal was to design a space where students had the freedom to explore and have access to stored materials to use for creative projects. This freedom also engenders responsibility as students know to use the materials respectfully and return them to their location when finished. Also, through this method, students shape their learning experience depending on their level of curiosity. A thoughtfully designed space promotes this curiosity in an organized and flexible environment. Through technology integration,

the classroom design gives students access to devices when appropriate, while not making these the focus of the space.

Early childhood education propels students to succeed later in life, and a well-designed Pre-K facility offers a place for that learning to start. It provides students a place where they make connections with their peers, with the content, and with their community that will have a positive impact throughout their lives. The quality of the spaces within a facility should respond to the needs of early learners and create a foundation for their path to fulfilling their learning potential. ■

**Grand Rapids Community College, Phyllis Fratzke**
**Early Childhood Learning Laboratory**
*Grand Rapids, Michigan*

# Pose big questions

A new collaboration with our academic partners tackles urgent topics in design research.

*BY GWEN MORGAN*

*A Principal and Stantec's Discipline Leader for Interior Design, Gwen is passionate about creating dynamic learning environments.*

**Bristol-Myers Squibb Biologics Discovery California**
*Redwood City, California*
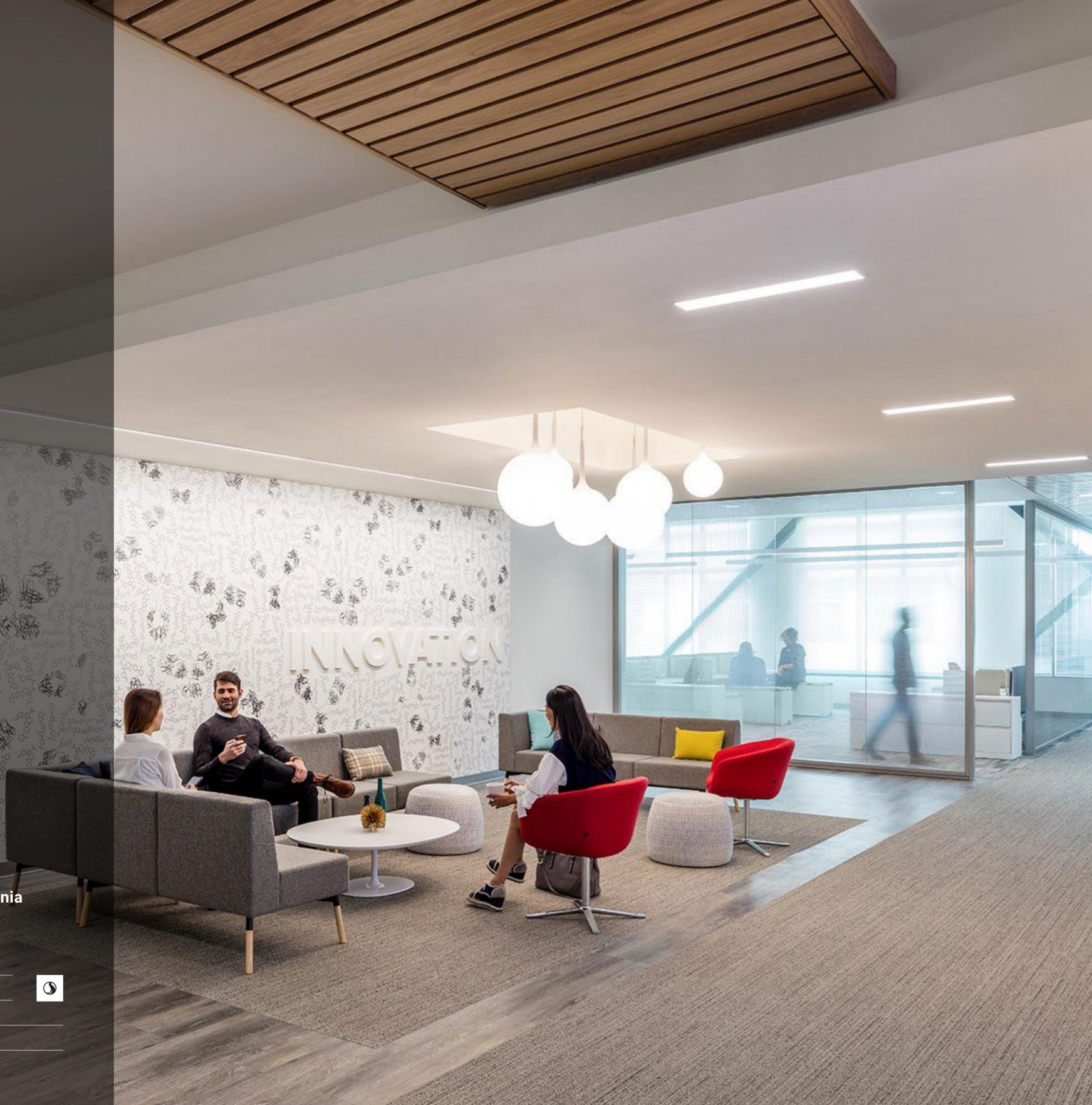
W hether you are practicing design, learning how to do so, or teaching others about it, curiosity is an important driver for creating better solutions. How will digital technology reshape the way we experience interior spaces? How can we design more resilient communities that will thrive even when stressed? What's the relationship between design, inclusivity, and equity? These are some of the questions that have been driving our most recent research explorations, and it turns out we weren't alone.

At Stantec we love engaging with educators and students, and not just when they happen to be our clients. For the past three years, Stantec has been a proud sponsor of the Interior Design Educators Council (IDEC), an organization whose mission is "the advancement of interior design education, scholarship, and service." The IDEC is a platform that connects interior design students, educators, and practitioners. This year we wanted to take our partnership to the next level and find an opportunity that not only gives back to the education community financially, but also supports our mutual goals: improvement of our practice through research and preparation of students for careers as design professionals. **>**

**Technology Client Regional Office**
*Madison, Wisconsin*

**The Stantec Innovation Partnership Grant**
Inspired by these commonalities, the Stantec Innovation Partnership Grant was born. Through this grant, we invited academic research teams to partner with us to explore a question of interest within one of three themes as they pertain to workplace, healthcare, or educational facilities.

**1. SMART BUILDINGS**
The ways in which we meet, work, move, share, and relax are entwined with digital tools that inform, arrange, measure, display, suggest, and prompt us through our daily experiences. As interior designers, we strive to create the most effective settings in which all these activities take place, even as technology innovation accelerates.
What are the implications for interior designers seeking to provide the optimum human experience for a client in this ever-shifting context? How can interior designers leverage the tools available for clients today, while maintaining flexibility for the future? What is the appropriate balance between benefits and consequences technology may present, for example connectedness and respite, convenience, and privacy?

**2. RESILIENCE**
Human nature seeks growth, change, flexibility, and increased strength. We want to thrive, not just sustain. Design plays a key role in creating a resilient community with the ability to bounce back stronger from shocks and stresses. In an increasingly volatile environment, how can interior designers offer our clients choices that help them meet their current needs in a way that allows flexibility for the future, whether that be their own changing needs over time or for a future occupant of a building? What decisions can an interior designer make that achieve beauty, functionality, and durability while lowering the environmental impact of our projects? How can we create spaces that foster social resilience, enhance local identity, strengthen community cohesion, and provide refuge from tumultuous events, both climatic and social?

**3. DESIGN JUSTICE**
Design justice explores the relationship of design, inclusivity, and diversity to uncover structural inequities in the interior environment and the processes by which it is designed. At a minimum, we ask how we design in such a way that all voices are authentically expressed and heard? How do our designs make it possible for people to feel safe, included, and equal? What are the opportunities in design that will encourage individuals to thrive and be their best selves? How can interior design contribute to a diverse and flourishing society?

We received a number of entries for the grant, all of them thought-provoking and intriguing. Through a double-blind selection process, we chose a proposal in the resilience track from Lawrence Technological University (LTU) examining how interior environments can support tacit mentorship in the hybrid workplace. Traditionally, organizations benefit from the tacit knowledge transfer in workplace mentorship. Now, however, these organizations are curious how the new "hybrid workplace" (the combination of in-person and remote interactions which emerged during the pandemic) influences mentorship and its implicit benefits. **>**

*"LTU's motto of Theory and Practice are not empty words, but the foundation of everything we do. As a practitioner for nearly 20 years who only recently made the shift to full-time educator, I applied for this grant because I believe there is a powerful connection between academia and design firms—both bringing important perspectives and skills to the partnership. In academia, we have time and resources for research, while the designers in practice bring an important perspective of what is happening in the field in real-time."*

**Jenna Walker,** NCIDQ, IDEC, LEED AP, EDAC
*College Professor + Director of Interior Design*
Lawrence Technological University
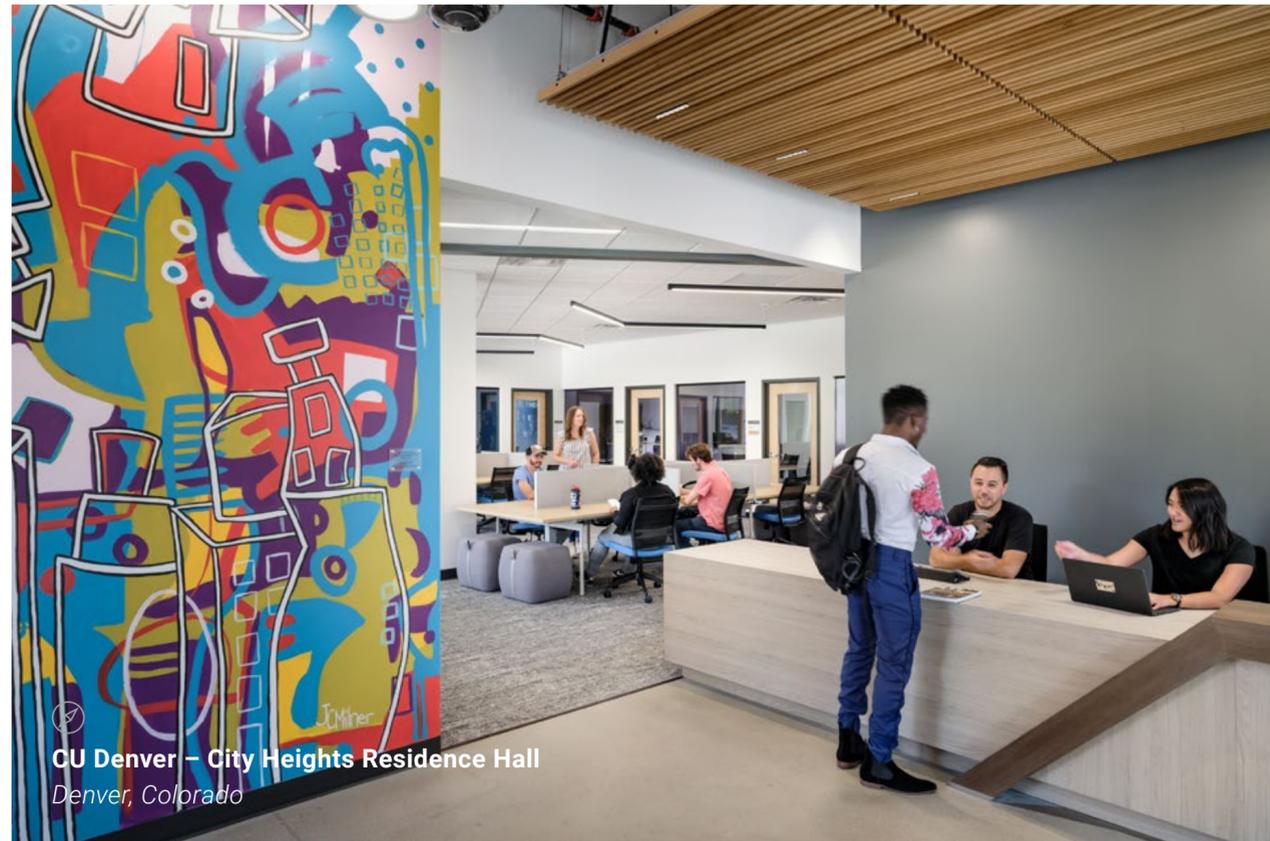
**CU Denver – City Heights Residence Hall**
*Denver, Colorado*
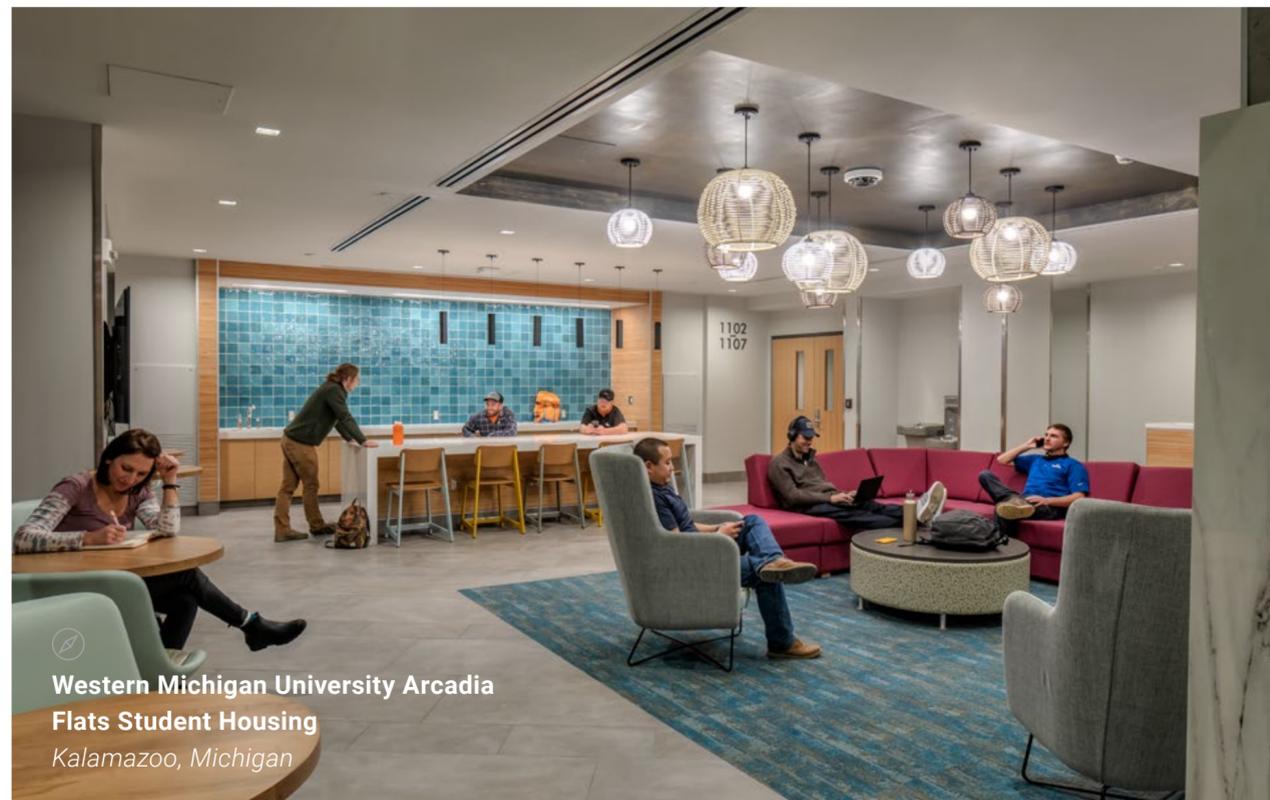


**Western Michigan University Arcadia Flats Student Housing**
*Kalamazoo, Michigan*

The Stantec team and LTU are now working together to gather qualitative data through interviews and discourse analysis to see what we can learn about the spatial implications of hybrid work for our buildings. There are three phases to the research project.

**PHASE 1:**
Data collection
A team of students will collect data in interviews focusing on tacit knowledge and mentor reflections with focused questions addressing issues around space and proximity. The interviews will span a variety of creative professions including interior design and architecture, as well as industrial design, game design, automotive design, landscape design, graphic design, and others. The interviews will be split between two different experience and knowledge levels. In other words, we'll talk to both the mentors and the mentees to get both perspectives.

**PHASE 2:**
Discourse analysis
Researchers will analyze the interviews for qualitative content using a discourse analysis approach. This analysis will focus on elements of interaction in mentorship and growth of professional expertise through tacit and non-structured interaction. The analysis will be distilled into simplified insights.

**PHASE 3:**
Scenario planning
Armed with the insights from the interview analysis, we will host a workshop to explore how design might respond to those takeaways. The workshop will bring together students, professors, researchers, and practitioners to explore, brainstorm, and craft possible interior design solutions to workplace environments that can better support tacit mentorship. **>**

INTERIOR DESIGN



Designing with community in mind means being on the forefront of research and innovation. Stantec is proud to partner with IDEC to advance design scholarship, and we are eager to see the results of the opportunity to work together, as practitioners, educators, and students, to solve problems creatively and improve the quality of life for the communities we serve and inhabit.

The research project with Lawrence Technical University has only recently kicked off, is scheduled to be completed by May 2022 and we're more than a little excited to see where it leads. Keep an eye on future Stantec publications such as this one for a summary of the research team's findings. ■

**The Tennyson**
*Plano, Texas*

# Experiments in found space

## What do libraries move in when shelving moves out?

### PATRICK CALHOUN

*Patrick Calhoun is an Architect and Senior Planner whose 30-year career has focused on educational planning and design.*

### LENDA STURDIVANT

*Lenda Sturdivant is a Senior Interior Designer with 14 years of experience in libraries and educational facilities design.*

**University of North Dakota Chester Fritz Library Renovation**
*Grand Forks, North Dakota*
Stantec | ICON Architectural Group

P rinted books are taking up less floor space in the modern library. The question of what to do with this found space is usually answered by making it available to users. But how do you know the space is doing what's required?

Libraries are connecting needs and found space in new ways, creating positive outcomes. In our research and interviews, we see alignment between the American Library Association, the International Federation of Library Associations, and library leaders in the emerging trends they see reshaping libraries. While there are dozens of trends, the ones impacting our clients most include hybrid digital/physical service models, demand for community-facing resources and issues of diversity, equity, and inclusion.

On many of our library projects, we have promoted the idea of prototyping new spaces and new services in existing spaces during design, working out processes and experiences when changes are less costly. The more we asked, the more we started hearing stories

about libraries experimenting with space in ways both big and small—connecting people to nature, testing out innovative programs, meeting needs of underserved communities, and improving user experiences.

This inspired us! We know there are uncounted, amazing experiments going on and they should be shared. Our team is reaching out to public, school, and academic libraries, collecting and cataloging these stories, and asking a few questions:

- How are you using space to experiment with new ways of fostering inclusion and diversity, growing community facing resources, and providing a better service experience?
- What are the drivers behind your experiment?
- What are the outcomes?

We have only begun to collect input but are encouraged by the breadth of ideas we're seeing. Consider these early examples of libraries experimenting at the intersection of space and programs as an invitation to share your story. >

## University of North Dakota – Chester Fritz Library (Grand Forks, North Dakota)

The 2017 library master plan proposed a low-cost, high-impact way to build excitement for future renovations: repurposing space occupied by reference materials and a massive service desk to test new service models; provide collaboration space, and create a one-button AV studio for student and faculty use.

Now expanded and named the Knowledge Commons, it offers permanent services including the student-led Peer Research Consultants, the one-button studio, reference librarians and access services. The library provides drop-in space for the Writing Center, student advisors, new student orientation and others. The increased foot traffic means more students are aware of available services. Other groups now show interest in providing pop-up services in the library.

**University of North Dakota Chester Fritz Library Renovation**
*Grand Forks, North Dakota*

## University of Michigan – Shapiro Library Renovation (Ann Arbor, Michigan)

The University of Michigan's Shapiro Undergraduate Library, with large areas of traditional quiet study and stacks, serves the entire undergraduate student body as part of multi-library system. As part of its renovation of the third floor for new services and spaces, the Library Environment Department created a framework to prototype and measure how spaces and services could meet new institutional goals of "explore/create/share." This experiment in building use gained extra dimensions during a pandemic and renovation delay that allowed for deeper understanding of student and staff needs over three different situations:

**PRE-PANDEMIC:**
The department experimented with small temporary spaces to test user tolerance for visibility, noise, and privacy. Study space prototypes were implemented to test group study and desired amenities for our service and space framework with varied furniture and layouts. Regular observation, student surveys and heat mapping showed that "share" behaviors more than doubled in the prototype spaces.

**PANDEMIC:**
The department pivoted to serving diverse needs in the library spaces during the pandemic. It implemented contactless pickup area for holds and interlibrary loans in the atrium. Temporary welcome desks in multiple library buildings provided information for incoming students. Advanced reservation study tables and on-the-spot reservable study carrels were also made available.

**FUTURE**:
Data provided from the last two years will inform the Library Environment Department's programmed use of the renovated third floor. It will continue the experiment by providing long-form student project spaces, solo and group study, varied seating, a "living room" space for gathering and relaxing, pop-up exhibit spaces, and spaces for instruction, workshops, and service experimentation, particularly around digital scholarship. >

LIBRARIES/LEARNING COMMONS



Temple University – Charles Library
*Philadelphia, Pennsylvania*
Stantec | Snohetta

**University Park Public Library, (University Park, Texas)**

At the University Park Public Library, the layout includes a ground floor lobby entry, main services on the second floor, and a community meeting room on the third floor.

The third-floor meeting space was created to provide rentable gathering/event space for up to 110 people and is equipped with A/V technology to support a variety of activities. The second floor hosts traditional library services as well as a flexible children's area with mobile shelving that can be moved to accommodate a variety of children's programs. But the popularity of the children's programs in the community, regularly drawing 100+ attendees, meant the space quickly outgrew its capacity.

The library pivoted the highly flexible meeting room and added to its many uses by hosting the children's programs on the third floor. As an added benefit, this relocated one of the noisiest activities out of the open library.

**Oakton Community College (OCC) – Cannabis Lab (Des Plaines, Illinois)**

The emerging cannabis industry has been a learn-on-the-job profession, with few formal training processes. Oakton was awarded a Community College Cannabis Program License by the state to create a cultivation lab on campus. Partnering with a regional producer, OCC developed this into a full production lab.

When developing the program, a major hurdle was finding secure space in the main campus building to house the program's 3,000 SF lab. The answer? Head to the basement. Underutilized storage space in the lower level of the library wing turned out to be perfect—secure, not easily reached, and able to support a standalone HVAC system.

While not the original plan for this library space, this unique use proves that flexible library space is perfect for trying current ideas. The College has started looking into how the remaining space can support student learning in traditional ways. ■

**Testing new ideas in existing spaces**

To remain relevant as a physical space, the modern library must be a place of discovery, resources, and exploration. Testing new ideas in existing spaces is a cost-effective way to quickly prototype, measure and develop strong programs, reimagining what is possible before undergoing a major renovation or new construction.

We'd love to hear from you! To share your story of experiments in space and programs, participate in our survey.

For more on the ALA Library of the Future Trends, visit www.ala.org/tools/future/trends.

# Mapping today's health practice to modern health education

Recent health sciences projects make an interdisciplinary approach a reality.

### CYNTHIA LABELLE

*Cynthia is a Principal, Lab Architect, and the Science and Technology Market Leader for Stantec's Texas Buildings practice.*

### ALEX WING

*Balancing analysis and design, Principal Alex Wing develops optimal solutions between academic, research, and support facilities to achieve client goals.*

**Camosun College – Alex & Jo Campbell Centre for Health and Wellness**
*Victoria, British Columbia*

**Research + Benchmarking**

H EALTHCARE IS CHANGING, REORIENTING TO NEW APPROACHES TOWARD TEAMS OF SPECIALISTS WHO FORM, OFTEN TEMPORARILY, TO MEET THE SPECIFIC NEEDS OF THE PATIENT. WE REGULARLY DESIGN HEALTHCARE BUILDINGS FOR PROVIDERS SUCH AS THE VETERANS ADMINISTRATION WHICH TAKE SOME DEGREE OF AN INTERDISCIPLINARY APPROACH TO PATIENT CARE.

**Emerging trend: Interdisciplinary health science education**

Likewise, health science education is trending toward practices which recognize the importance of building teams focused on shared themes of human health and well-being. An aging population coupled with a critical need for healthcare professionals is fueling an expansion of health sciences education across a broad array of institutions. Facing this "perfect storm" of unmet demand and evolving delivery models, health science education is advancing to focus on interprofessional cooperation along the entire continuum of care.

So, today's challenge for health science designers is to map healthcare practice to education, creating meaningful connections between pedagogy and contemporary practice. There's terrific opportunity but

also complexity to embracing this interdisciplinary approach and it is not always a perfect fit. Within a university, for example, how do you bridge the gap between cohorts studying specialization while also giving them opportunities to collaborate in realistic simulations which engage the full range of healthcare delivery partners? Further, for many institutions, the challenge and opportunity extend to the integration of a rigorous health sciences curriculum with the strengths in the liberal arts and humanist studies which define them.

As designers, we look for opportunities to design these health science facilities with collaboration space, as well as spaces that connect to and simulate the entire continuum of care. Flexibility is key here, because the healthcare practices we want to map in education continue to evolve. >

**Emerging strategy: Extend the use of space**

Alongside the trend toward interdisciplinary, team-based health sciences is the need for colleges and universities to get the best value in capital expenditures, coupled with an increased focus on reducing carbon footprint. Institutions are challenged to do more with less. Specialized spaces with minimal or sporadic use patterns are required to become as flexible as possible. Institutions are looking for designs that allow them to share resources across departments, get multiple uses out of a space, and integrate opportunities for ad-hoc utilization. At Lebanon Valley College, we designed a physical therapy space that can transform into a conference/event space and serve as a continuing education resource and resource for the institution. We always consider other elements we can layer onto the program to extend the use of space.

Health sciences education has obvious redundancies. Traditionally, nurses, doctors, and technicians use suites of spaces dedicated to fundamental courses like anatomy or clinical skills. We can thoughtfully design these spaces with the ability to adapt to multiple modes of instruction. This multi-modal approach enables suites of spaces to simulate a wider range of healthcare settings while encouraging interaction and collaboration between cohorts. In addition, these multidisciplinary, flexible spaces can serve as regional resources, generating additional income streams for the host institution. **>**

**Thompson Rivers University
Chappell Family Building for Nursing
and Population Health**
*Kamloops, British Columbia*

SCIENCE & TECHNOLOGY



**Stay conscious of disciplines and specialization.**
Flexibility means that disciplines may share more classes and that specialized learning environments are designed to be convertible for other uses. But it's important that designers see the limitations of this approach and find ways of discovering multiple uses while respecting the requirements of the different disciplines. Educators and students need the right equipment, the right tools, and the right setting. A hospital simulation environment will not work for athletic training or physical therapy class. And scheduling can be complex—many specialized training regimes do not run on the semester system.

**Evaluating case studies**
With an understanding of the trends shaping health sciences education today, it's fruitful for us to take a close look at recent projects in which we've made efforts to achieve a degree of flexibility, interdisciplinary and collaborative education while allowing specialization. Which strategies have worked, and which need adjustment? **>**

Camosun College – Alex & Jo Campbell Centre for Health and Wellness
*Victoria, British Columbia*

*"CSU is on the forefront of a new era in the education of health professionals where students pursuing complementary career paths will learn together and interact with each other, bringing with them into the workplace the skills and experience involved in teamwork that is coming to define modern health care delivery.[1]"*

**Dr. Ronald M. Berkman**
*President*
Cleveland State University

1.  *Cleveland State University. (2015, September 2). CSU Dedicates Recently Completed Center for Innovation in Medical Professions. Retrieved from https://www.csuohio.edu/news/csu-dedicates-recently-completed-center-for-innovation-in-medical-professions.*

**Cleveland State University – Center for Innovation in Medical Professions (Cleveland, Ohio)**

The forward-looking facility prepares students for today's interdisciplinary health practice by combining research and clinical training programs, a wellness clinic, nursing labs, and occupational therapy/physical therapy training space, as well as distance learning rooms, all under one roof. In this environment, students and researchers in nursing, speech and hearing, audiology, physical therapy, occupational therapy, and other disciplines can team up to develop collaborative approaches to health care. Since its opening, the new Center for Innovation in Medical Professions has successfully created a community of learning where future physicians, nurses, and health professionals can learn to work together. **>**

**Cleveland State University – Center for Innovation in Medical Professions**
*Cleveland, Ohio*
Stantec | Pelli Clarke & Partners

R+B

**Lebanon Valley College – Jeanne and Edward H. Arnold Health Professions Pavilion (Annville, Pennsylvania)**

The new building's original program brief included a need for conferencing facilities along with a desire for occasional group meeting space for the entire cohort of 160+ students enrolled in health science programs. In response, our team developed a physical therapy suite designed to combine adjacent laboratories into a single large meeting space flanked by an open atrium which does dual duty as a reception space and learning commons. **>**

Lebanon Valley College – Jeanne and Edward H. Arnold Health Professions Pavilion
*Annville, Pennsylvania*

SCIENCE & TECHNOLOGY





**Pennsylvania College of Health Sciences (Lancaster, Pennsylvania)**

The building includes a full range of high-fidelity simulation spaces to reproduce the hospital environment. Intensive Care Unit (ICU) suites, complete with nursing stations and patient monitoring areas, closely match those from a true healthcare setting, yet double as student workspaces and informal instructional areas when not being used for formal simulations. Adjacent simulation environments serve as multi-venue learning environments, combining classic monitored simulation space with team meeting areas designed to allow both formal debriefs and ad-hoc project work. **>**

**Pennsylvania College of Health Sciences**
*Lancaster, Pennsylvania*
Stantec | Greenfield Architects

**Harrisburg University of Science and Technology Health Sciences Education Building (Harrisburg, Pennsylvania)**

The original program for the Health Sciences Education Building called for four nursing skills labs and two separate simulation suites. Seeking to improve utilization and create opportunities to address clinical activities along the continuum of care, we designed this multi-modal suite so that simulation suites can be quickly converted into a skills lab setting. The design solution eliminates two dedicated nursing skills laboratories without sacrificing the quality and availability of instructional space.
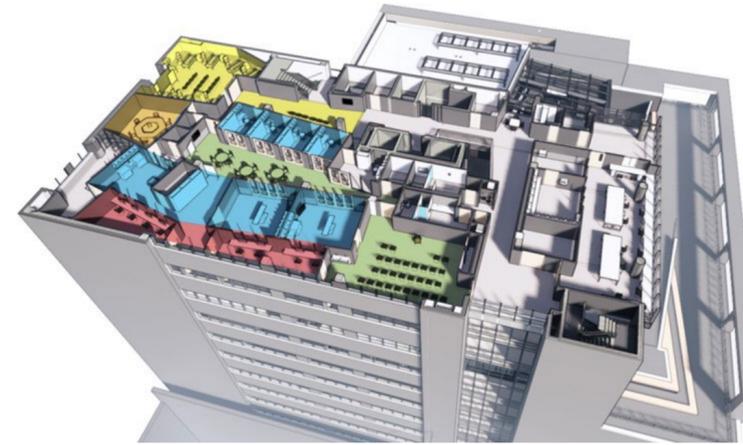


**MODE 1**
**Simulation Suite**

- Student prep
- Standardized patient prep
- Clinical simulation
- Observation
- Debrief / Reflection
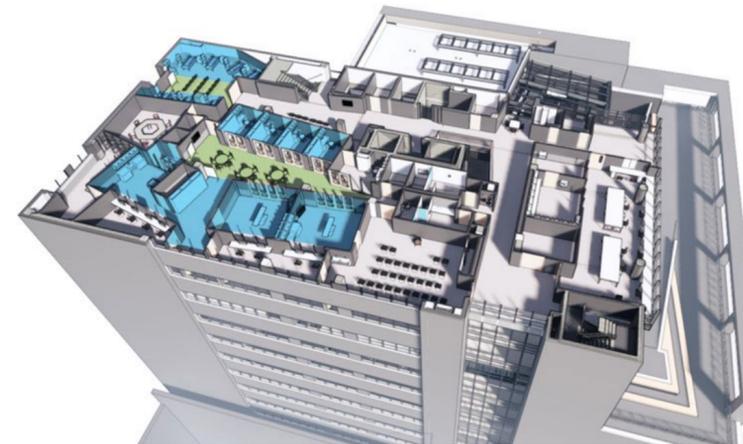


**MODE 2**
**Nursing Lab**

- Lecture / Prep
- Treatment Simulation
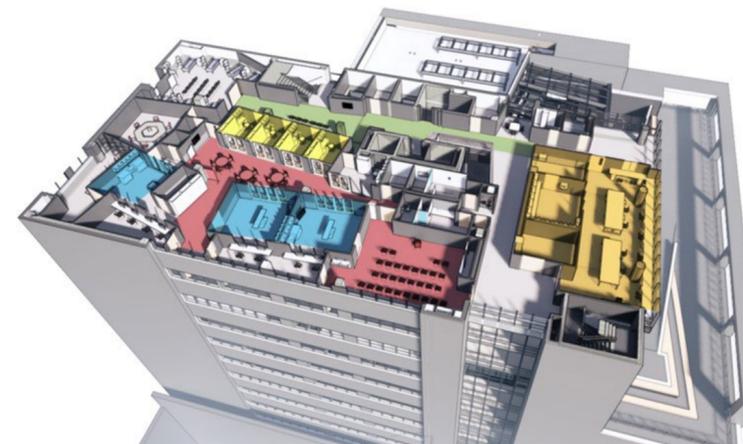


**MODE 3**
**The Continuum of Care**

- Intake / Triage
- Consultation
- Treatment / Procedure
- Recovery / Occupational Therapy
- Pharmacy

## Planning ahead

The demand for healthcare and science education that prepares skilled professionals for team-based approaches to meeting the needs of community members across the continuum of care will only grow. We are at the front end of a sea change in approaches to health education and care. Our health science education spaces need to be dynamic, fluid, and multimodal, and our design solutions for them continue to anticipate future changes. ■

# Digging deeper into EUI

To meet performance targets we devised a new framework for the design process.

**BY ZACH VAUGHN**

*A Mechanical Engineer and passionate advocate for integrated design, Zach provides clients with mechanical design, energy analysis, commissioning, and property assessment services.*

**Elizabeth Quintal School (LEED Certified Gold)**
*Peerless Lake, Alberta*

n 2006, the 2030 Challenge declared that buildings were responsible for nearly 40% of annual global $CO_2$ emissions[1], and that the industry needed to make dramatic design efforts to change this. In response, AIA created the 2030 Commitment, a national program aimed at supporting design firms' efforts to meet the 2030 Challenge with a database for reporting and analyzing their projects' performance.

The 2030 Commitment is oriented around Energy Usage Intensity (EUI). EUI is a deceptively simple number that describes a building's energy efficiency in annual energy usage per square foot. A single number summarizing a building analysis, EUI gives no suggestion to the countless design decisions and building systems contributing to that metric. Currently, the 2030 Challenge calls for buildings to be designed for 80% reduction of the average regional EUI, with the goal of becoming carbon neutral by the year 2030. The 2030 Commitment requires firms to report the predicted EUI (pEUI) in projects to track the industry's progress towards the 2030 Challenge.

Unfortunately, you'll find that many industry professionals view the 2030 Challenge as an inconvenient requirement. The pursuit of EUI metrics has led to "energy modeling" being emblazoned on countless industry flyers, conference lectures, and memos; it is pushed, poked, and paraded so much that our industry has become tunnel visioned, desperate to shoehorn any semblance of an energy model into a project so that they can report a pEUI. **>**

1. *Why the Building Sector? Architecture 2030. Retrieved from https://architecture2030.org/why-the-building-sector/*

## Reporting EUI is not enough

Simply just reporting EUI neglects a key point: the 2030 Commitment isn't a commitment to reporting, it is a commitment to operational performance, a commitment to be carbon neutral by 2030. This target helps the environment, but also helps our clients by reducing operation costs for the entire lifetime of their buildings. Energy modeling is just one of the tools to achieve that target, albeit a vital one. 2030 Commitment has called on us as design professionals to take the reins of our building design and steer it towards a sustainable future, and that takes more than just checking a box and reporting a pEUI to move the needle.

In 2020, the industry reported an average of a 51% pEUI reduction on 3.5 billion SF of work to AIA's 2030 Commitment, far short of the current 80% reduction target. Our buildings aren't on track to meet the challenge when the target reduction raises to 90% in 2025, nor 100% in 2030. To improve that EUI, we need to understand and control all the facets that collectively influence building performance. A process that understands the connections between all these influences is what separates those that imitate design, and those that drive it forward.

## Research yields a new approach

Our Research + Benchmarking team wanted to use EUI as a spark to explore and define the connections that impact total building performance. Our research evaluated key analyses conducted across disciplines and the design process to identify inherent dependencies.

We studied past projects and interviewed team members to understand how these analyses are helped or hindered by the typical project's design process and determined that three key factors were dominant in an analysis' impact on building performance: clearly defining the analysis and tasks, timing of those tasks, and communicating results. A breakdown of effective timing and communication could have many detrimental results, for instance reduced integration of energy efficient strategies, increased cost implications for energy saving measures, or a reduction in potential energy savings and building performance. We needed to formalize design feedback loops to ensure that building performance analyses are given sufficient time and attention to be conducted and influence the design. Analysis should drive design, not merely document it. **>**

**Sandy Spring Friends School (WELL – Pre-certified Gold)**
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# High Performance Design



**DEFINE**
Context and constraints for design

Example Tasks:
• Set sustainability goals.
• Study site.
• Study systems feasibility.

**ASSESS**
Evaluate performance, value and cost implications.

Example Tasks:
• Analyze envelope, perform solar analysis.
• Analyze systems performance and cost.
• Identify strategies for resilience and conservation.

**REFINE**
Utilize 'energy' and comfort as metrics in decision making

Example Tasks:
• Analyze building's energy use in detail.
• Study occupant comfort (daylighting, glare, acoustics, etc.)
• Analyze strategies for resilience and conservation.

**DETAIL**
Confirm final design and pEUI

Example Tasks:
• Document pEUI in AIA database.
• Provide feedback for future projects.

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**A new framework**
All of our projects deserve due diligence and thoughtful, high-performance design. The decisions design professionals make at every step of the design process influence how the buildings will perform for the lifetime of operations for our clients. To work towards this common vision, we need a recurrent language. In response, we created a framework, an annotated design timeline, to serve as that paradigm. Our framework aims to ensure proper integration of building performance analysis in the building design in two ways:

**1. Define key performance junctures**
The building design process is a tapestry, woven from the work of many disciplines. Choices pull on each other, tension is transferred and shared between threads, and missed coordination weakens the fabric. Every decision influences a building's performance in the big picture. Our framework identifies points in the design fabric where it is most knotted, where the most disciplines are dependent on that one key juncture. A design juncture is typically an analysis or design meeting, but it can be any facet in the design process that has a lot of disciplines tangled in its outcome. It illustrates the connections between disciplines and design components, and identifies the key stakeholders and the guiding analysis that either influence or are dependent on that juncture.

**2. Sequence these junctures**
These connections have direction, a natural flow and order. By sequencing these junctures, we ensure an efficient flow of information between them, highlighting the natural dependencies between analysis and prerequisite decisions. When it comes to timing, earlier is not necessarily better. We need to also consider who is involved, if prerequisite decisions have been made, if results will be properly distributed and integrated into the design, and if the decisions will stand the test of time or be altered. Every analysis requires input to the process, sometimes these inputs are outputs of other analysis, or decisions made in team meetings. When designers are forced out of the natural flow, when answers or decisions are demanded before all the information is given, inefficiencies mount. To become more efficient, we established sequencing so each decision and analysis can flow into the next, building a solid foundation, instead of doubling back to fill design gaps.

This sequencing provides a big picture on where and what decisions should be made along the design timeline and allows sufficient time for that vital building performance feedback and creative problem solving. **>**

## Timing is Everything

Completing these tasks during the appropriate design stage gives a project the best shot at attaining high performance.

- Set and confirm design criteria in predesign.
- Determine feasibility of systems in schematic design.
- Run discipline designs through energy analysis in design development.
- Document and detail the final design in construction documentation.

**Starting the conversation**
By creating a feedback loop and connecting design decisions to building performance, we can make the most effective choices as early in a project's design process as possible. Adjusting the design process can be overwhelming, but if we want to design high-performance buildings, we need a high-performance process. By moving towards a smart design process, we're setting the stage for smoother and more efficient projects and better building performance for years to come. ■



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Stantec