



Achieving a 4.0 for Sustainability in Higher Education

Examine the Needs of Campus Environments & Find Sustainable Ways to Contribute to Them

Objectives:

- Update your knowledge on the latest design trends in higher education that focus on optimal student performance and satisfaction.
- Learn how to leverage sustainability into the design conversation by addressing institutional goals and harness the health and economic benefits that sustainability has for stakeholders.
- Discover how sustainability can be integrated into design to impact performance and health of students, faculty, and staff by analyzing material health and applying biophilic design.
- Highlight acclaimed Green Building Certifications and learn how they can benefit an institution by offering learning opportunities to students, reducing operating costs, and being used as a marketing tool.

Design Trends that Address an Institution's Needs

Rapid evolution of technology means that learning is no longer confined to the classroom. This makes facilitating space for optimal learning and focus crucial in multiple areas throughout a campus – dormitories, dining halls, service centers, and libraries. To accomplish this, these areas must be updated to include features such as outlets, charging ports, bright lighting, comfortable furniture, and refreshment areas. These updates are critical as student satisfaction in design is a deciding factor on attendance, ability to focus, and knowledge retention.

“Design and layout influences how often students frequent an area, their learning outcomes, and even their decision to remain at an institution.”

Importance of Flexibility in Resimercial Design

Strict budgets, continuously evolving technology, and student expectations make flexible space arrangements ideal in facility design. Integration of multiple disciplines and faculty into one multi-purpose building can bring more cohesion to a facility and allow stakeholders to utilize a space to all of its potential.

“Resimercial” design helps institutions do just that.

“Resimercial” design is a combination of residential and commercial space archetypes. It helps to:

- Ease the integration of incoming freshmen
- Prepare students for future in the workplace
- Create a campus as a mini city – a place to eat, shop, work, play, and live

This mixed-use design is also beneficial for accommodating community interests. A campus' use extends beyond its staff and students; it is also a cultural center for the community in which it resides. Events, ceremonies, and meetings are a few examples of events that will take place for businesses or officials. Therefore, the design choices made must not only reflect the student population but also the community.

STEM Majors, Employment, & Renovations

As student debt rises, the pressure on institutions to prepare students for fast employment rises. Well-designed spaces that mimic the workplace benefit this cause. STEM Majors (Science, Technology, Engineering, Mathematics) currently offer the most fertile employment, and their buildings have become the priority for renovation and construction. To better market a STEM degree to prospective students and promote a sense of connectedness among current students, STEM classrooms, labs, and workshops are being moved to prominent areas of buildings with large windows to display the high-tech equipment and active research.



Branding vs. Design Color Scheme

Instead of intense on-campus branding of an institution's logos and colors, which are often purposefully extreme, common spaces benefit more from subtle tones of the school color scheme, especially those that can complement natural tones. Cooler colors calm anxiety and assist in stress reduction. Blues and greens are encouraged where math, science, and literature-based courses are held. Hallways and entrances can use bright, high-energy, extreme colors to uplift energy between classes. A balance of color helps achieve a sense of "soul" in design.

"Sustainability is NOT an option anymore in higher education."

Sustainability Considerations for Institutions

As younger generations grow up amidst climate change conversations, students become highly interested in sustainability. Many will base their choice of institution on a place with sound sustainability practices. Institutions must be prepared to answer these questions:

- Does your institution have a sustainability goal or philosophy?
- Are you pursuing or planning to pursue any building certifications?
- Do you have a sustainability story?

The Responsibility of Health in Buildings

Humans spend about 90% of their time indoors, making buildings responsible for significant health issues. The EPA reports indoor air pollutants can be 2 to 5 times higher than those outdoors. The American Lung Association counts 14 million days of school being missed each year due to the effects of indoor air quality. Asthma triggers, increased headaches, frequent fatigue, lower student performance, tiredness, and sick building syndrome are all potential side effects of poor indoor air quality. Sick Building Syndrome refers to headaches, nausea, dizziness, throat irritation, and

eye irritation, typically associated with buildings with poor ventilation and off-gassing. Off-gassing culprits include indoor furnishings, poor HVAC systems, chemical cleaners, and vehicle exhaust that enters through ventilation. HVAC maintenance can help reduce off-gassing particles. Material transparency disclosures can also help improve indoor air quality as they allow consumers to be more informed about the products they buy.

Importance of Material Transparency

Material transparency involves making all relevant information about a product open and freely available to the public – ingredients, health effects, manufacturing location, finishes, etc. Material transparency aims to reduce and eliminate the proliferation of red-list ingredients within building products. Red List ingredients are the "worst in class" additives that have known health side effects, as identified by the International Living Future Institute. Disclosure documents that help facilitate this transparency include:

- **Declare Labels:** Disclose ingredients, red-list ingredients, chemicals of concern, manufacturing location, VOC content, and status within Living Building Challenge.
- **Health Product Declarations (HPDs):** Report product ingredients and associated health information.
- **Environmental Product Declarations (EPDs):** Comprehensive documents that cover a product's life cycle impacts, including global warming potential, water pollution, smog potential, ozone depletion, and material source distances.

"Whole Building Approach" to Sustainable Design

With long-planned lifespans of educational buildings and massive renovation budgets, sustainability is paramount. Improvements in building materials, design, and function can accrue benefits such as reduced distractions, fewer sick days, improved behavior and performance, increased focus, and financial benefits such as improved building performance, savings on health spending, and maintenance costs. Sustainability doesn't cost - it pays! Even modest sustainability investments can reduce operating costs and attract students. These savings can then be allocated to student programs or design improvements in other areas to provide further benefits.



“65% of institutions have reported a greater ability to market and appeal to potential students and 33% noted improved enrollment.”

Biophilic Design

Biophilia refers to humans’ innate desire to connect with the natural world. Biophilic design uses elements from nature to foster our connection with the environment. This includes daylighting, windows with views, natural patterns, water features, indoor plants, and natural elements like brick and wood. Building siting, orientation, massing, fenestration, and space planning incorporate this design practice. Benefits of Biophilic design in educational facilities include:

- Faster learning rates
- Improved student performance
- Increased happiness and focus
- Improved student and staff retention
- Indoor air quality improvements from incorporation of plants
- Reduced costs from staff absenteeism
- Reduced energy expenses due to incorporation of natural
- Increased on-campus spending

Building Certifications

Leadership in Energy and Environmental Design (LEED)

LEED, administered by the U.S. Green Building Council (USGBC), is the most widely used and recognized green building certification standard. It provides a framework to create healthy, energy-efficient, cost-effective buildings. There are four levels of LEED certification:

- Certified
- Silver
- Gold
- Platinum

Certified status is attained through fulfillment of all prerequisites. Higher certification levels are achieved through fulfillment of optional credits.

Educational institutions follow LEED protocol under the sections for Building Design and Construction (BD+C). The subsections of Materials and Resources (MR) and Environmental Indoor Quality (EQ) align with sustainable design practices.

Living Building Challenge (LBC)

LBC is the most rigorous green building standard. The International Living Future Institute created it under the belief that buildings should give more back to the environment than they take. Using a flower metaphor, the LBC has seven “Petals,” or performance categories, representing different building performance categories. Within each Petal, several “Imperatives,” including one “Core Imperative,” define the actions that must be taken to fulfill that Petal. The Petals and associated Imperatives are:

- **Place Petal** | Ecology of Place, Urban Agriculture, Habitat Exchange, and Human-Scaled Living
- **Water Petal** | Responsible Water Use and Net Positive Water
- **Energy Petal** | Energy + Carbon Reduction and Net Positive Carbon
- **Health + Happiness Petal** | Healthy Interior Environment, Healthy Interior Performance, and Access to Nature
- **Materials Petal** | Responsible Materials, Red List, Responsible Sourcing, Living Economy Sourcing, and Net Positive Waste
- **Equity Petal** | Universal Access and Inclusion
- **Beauty Petal** | Beauty + Biophilia and Education + Inspiration

There are two pathways to this standard:

- Petal Certification
- Living Certification

Petal Certification is achieved by fulfilling all seven Core Imperatives and all Imperatives within the Water, Energy, or Materials Petals. Living Certification is achieved through the fulfillment of all twenty Imperatives.



WELL Building Standard (WELL)

WELL is the only green building standard to solely focus on the health and wellness of building occupants. International WELL Building Institute administers it. The new v2 standard is divided into ten concepts:

- Air
- Water
- Nourishment
- Light
- Movement
- Thermal Comfort
- Sound
- Materials
- Mind
- Community

WELL can be applied to two project typologies:

- **Owner-occupied** | The project is mainly occupied by the project owner.
- **WELL Core** | The project owner occupies a small portion of the project area and rents/leases most of the space to tenants.

There are three levels of WELL certification:

- Silver
- Gold
- Platinum

For all certification levels, all WELL preconditions must be met. Silver, Gold, and Platinum certifications are achieved by earning 50, 60, or 80 points of the 110 available.

Synergies across Green Building Programs

Synergies are areas where two building certification systems have standards that coincide. There are multiple synergies across the three building rating systems. By adhering to LBC Imperatives, a project could also achieve prerequisites and credits within LEED v4.1. Multiple Health, Wellness, and

performance-based features in WELL also align with LEED and LBC. Synergy tables, which show alignments between different standards, are helpful when a project owner is interested in green-rating systems but cannot dedicate resources towards certification. All the green rating systems have synergy around indoor air quality, transparent materials, low-emitting materials, and biophilic elements.