

# FORM follows FUNCTION?

## Innovations in Education Demand Flexible Building Design

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The typical high school graduate, born in 1984 or 1985, will be entering college in the fall, never having known a world without computers, cell phones or TVs. The way this student will be educated is remarkably different from the way many of us over age 30 were.

There is a fundamental change occurring in higher education—a pedagogic shift from teaching to learning. This shift is being driven by considerable and significant research into educational theory, behavioral and cognitive sciences and human development.

In the past, a common mode of teaching was lecturing. Today, many faculty facilitate discussions. The question “What should I teach to my students?” has evolved to “What should my students know?” and “How should my students learn?”

Students today are encouraged to be more proactive and to take responsibility for their own learning. They have more experiential and hands-on education than their parents. Most of us, in college, were expect-

ed to work independently as individuals; many students today work collaboratively in small groups. Creating a community of learners is an important goal of many educators.

Other forces are also changing higher education. The revolution in computer and communications technology has affected everything from groundskeeping to teaching to research. Off-campus and distance learning initiatives are proliferating. Institutions compete intensely for students and for financial resources. State and federal requirements on colleges grow apace. Through all this, there is an increasing need to maintain, renovate or replace aging facilities and equipment.

At the same time, building designs are evolving to support the changes taking place in education. The relationship between education and architecture is symbiotic—one affects the other. Building design can support and advance educational change, or it can hinder change.

In the not too distant past, architects created buildings for colleges and universities that were designed to meet the needs of specific programs or individual faculty. It was assumed that these programs would remain constant, and buildings were constructed accordingly. They were solid and often inflexible.

Today, in higher education, the assumption is that programs, teaching, research and technology will change over time, sometimes imperceptibly, often dramatically, and that buildings must be designed to accommodate change. The most successful academic buildings are those that allow rational and planned physical and programmatic change.

### Building features

Here are some of the effects on facilities caused by the changes in teaching and learning and the impact of education and architecture on each other.

**Atria.** Many new campus buildings are designed around an atrium. Originally, a Roman concept, these spaces were large open-air gardens in the center of residential buildings. Today, atria are large, dramatic, enclosed spaces, usually the focal point of a building design. There is an interesting, and perhaps accidental,

The Haas Library complex at Western Connecticut State University features a five-story glass atrium. The library was designed by Best Joslin and built by Konover Construction Corp. Photo copyright © by Richard Cadan.



confluence of architects' desires to create a dramatic and organizing space for their design and educators' desires to create collaboration and community space.

Colleges are often initially cautious about constructing an atrium because of added costs, but many embrace the concept when the programmatic possibilities become clear. This space can be an exciting focal point for a variety of events, such as gatherings, lectures, presentations, musical and theatrical activities, luncheons and dinners and study—as well as a space for formal and informal student and faculty collaboration.

#### **Smart classrooms.**

The most noticeable architectural change caused by pedagogical shifts has been in the size, configuration and technological outfitting of teaching spaces—classrooms and laboratories.

“Smart classrooms” are equipped with ceiling-mounted digital projectors that are connected to the computer, DVD, VCR, institutional network and the Internet. “Glorified overhead projectors!” say some who see the technology reinforcing the lecture style of teaching. But others believe the technology enhances a skilled instructor's ability to entice students to participate in the learning experience.

A lecture style of teaching requires that the students face the front of the room, and most of the interaction is with the teacher. A teacher who uses the discussion format needs to have students facing each other, seminar style around a large table or in a circle or u-shape, to facilitate interaction. The amount of space required for a discussion-style room that provides more flexible furniture and furniture arrangements is more than the amount needed for a lecture-style classroom.

On many campuses, there are few small classrooms and many large classrooms. This historical imbalance has become more noticeable as faculty have moved toward teaching class sections that are smaller and more conducive to the seminar and discussion style of interaction. The appropriate room size enhances this style of teaching, creating a close connection among participants and an informal intimacy that fosters dialogue and debate.



Flexible lab space at Boston College's Higgins Hall allows researchers to work closely with students and provide a hands-on approach to the science disciplines. The lab was designed by Shepley Bulfinch Richardson and Abbott of Boston. Photo copyright © by Woodruff/Brown Photography, 2002.

**Lab design.** A national movement to improve science, math and engineering programs and facilities is propelling dramatic changes in laboratory design. An informal national alliance of individuals and organizations committed to strengthening undergraduate education called Project Kaleidoscope (PKAL), has been instrumental in encouraging programmatic and architectural change on many campuses.

PKAL's argument is that learning science and engineering requires a lab-rich, hands-on, experiential, project-oriented collaboration of students and faculty learning and doing research together—especially at the undergraduate level. This style of teaching, learning and collaboration requires a different type of laboratory environment than typically seen in the past.

Large, long, lab benches fixed to the floor are being replaced with more flexible, and in many cases, moveable benches designed for groups of two to four students working together. In addition, larger labs are required because, often, the labs are designed with both a discussion area with movable seating as well as a lab bench environment with small group benches. The goal is to capitalize on the “teachable moment” by

enabling faculty and students to move back and forth between discussion and experimentation.

Science and engineering disciplines now require larger buildings for a variety of reasons including the need to provide the larger, more flexible labs, but also to provide student project and research space, at both the graduate and undergraduate levels, as well as space for increasingly more sophisticated equipment. As faculty adopt the idea that students learn more effectively by “doing” science and engineering, appropriate space needs to be provided for that hands-on experience.

**Meeting rooms.** Architects are finding creative ways to provide informal small group meeting and collaboration areas in contemporary academic buildings by designing them into alcoves within corridors, on open stairway landings and at the ends of corridors. These spaces are usually outfitted with movable tables and chairs for four to six people, network

ports, power outlets and whiteboards or chalkboards. These resources promote spontaneous collaboration.

**Faculty offices.** Faculty offices are increasingly recognized as both personal workspaces and teaching environments affected by pedagogical and technological change. Today, the faculty office may be used as a seminar or meeting room for small groups of students. In addition, computer, keyboard, monitor and mouse have superseded the use of pen, paper and typewriter. Along with the computer have come peripherals including printers, external drives and scanners. And in some disciplines, it is not uncommon to have two computers in the office. All this requires a reevaluation of the size, use and configuration of the office. When multiplied across an entire college campus, the need for more faculty office space has a significant impact.

**Libraries.** The most dramatic change in campus buildings is being seen in the library. Libraries are evolving from quiet warehouses to very specialized service facilities melding books, technology, online resources and active collaboration spaces to support various teaching and research needs. The changes are both internally driven by educational reform and externally driven by changes in technology, costs and copyright laws. Today, no one can say what the library of the future will look like. Because of the more varied demands placed on it, it is unlikely that the future library will require less space. But it will be a different and much more animated place.

## Seeing stars

One trend in campus architecture that requires careful implementation is the increasing use of “star architects” to provide highly visible, cutting-edge buildings. Colleges increasingly seek out these stars for a variety of reasons, ranging from the ambition to create a campus building that is fresh, different and innovative, to the enhancement of name recognition and branding, to the need to increase fundraising, and most of all, because it’s exciting.

Many of these standalone gems of buildings are functioning works of art that often are singularly different from others on campus. For some types of college and university activities, such a facility can be quite energizing. But for most academic purposes, they are not appropriate. All evidence supports the idea that programs, teaching, research and technology in higher education will change. Buildings must be designed to accommodate such change. A building conceived as a work of art—a piece of sculpture—won’t be changed easily.

Most colleges and universities know by now that if they don’t change, they won’t improve—and may not survive. What they may not know is that change can be enhanced or thwarted by the way in which it is anticipated and reflected in campus architecture and design.

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## High-Wired

Universities are trying to make educational technology readily available and easy to operate in all new classrooms. This faculty conference room at the Harvard Graduate School of Education, designed by The Stubbins Associates of Cambridge, Mass., features careful design of podiums, lecterns and wall-mounted control panels. With consistent user interfaces and interactive touch screens, the facilities provide simplicity of operation and eliminate the need for multiple remote controls. A centrally located phone connects faculty to a media center to immediately address any technical issues that arise.



Faculty conference room at the Harvard Graduate School of Education designed by The Stubbins Associates of Cambridge Mass. Photo by Warren Jagger.