

Soft Spaces: The New Glue for Science Education

Study Provides Hard Data from Multiple Sites

Informal learning spaces, also called "soft spaces," in academic science buildings have evolved from throw-away square footage tucked in alcoves and under staircases to purposefully designed hubs of activity. Experience, now backed by data, shows how important these spaces are.

"Programs are now written with these spaces in mind," says Leila Kamal, vice president of design and expertise at EYP Architecture & Engineering. "The more of these spaces (occupants) get, the more they want."

Including soft spaces in academic science buildings began as a trend in the early 1990s, in large part due to the emergence of the Project Kaleidoscope (PKAL) organization, whose mission is to improve the quality of learning in science, technology, engineering, and math environments.

"At first, it was very hard to sell informal space as an asset," says Kamal. "They absolutely wanted the space but didn't know how to get it."

This is particularly true at public institutions, where states are less likely to allocate money for non-teaching spaces in academic buildings, she says.

"By carefully analyzing the effective utilization of teaching spaces and classrooms, we often could help institutions squeeze out a little bit more space to create informal learning spaces within the project," adds Kip Ellis, a principal of academic planning and design at EYP.

As part of a larger study on the campus-wide impact of interdisciplinary science buildings, Kamal and Ellis examined 11 facilities that combine teaching and research and include programmed soft spaces to determine the following:

- How much space should be allocated for informal learning?
- What types of spaces should be allocated?
- How much do they cost?

An average of 15 percent of the square footage in interdisciplinary science buildings is now allocated for informal learning spaces, and they account for an average of 5.4 percent of the total building cost at \$172 per sf vs. \$355 per sf overall.

Kamal and Ellis found that the buildings must include a variety of informal learning spaces, and that these spaces must be designed and located properly in order to be effective.

Five Scales of Informal Learning Spaces

Undergraduate interdisciplinary science buildings support a continuum of science that includes teaching laboratories, research laboratories, instrumentation, prep or support space, offices, and classrooms.

"The informal learning spaces are the glue that holds all of this together," says Kamal.

Those spaces come in five sizes, the "five scales of informal learning spaces."

"We believe that it is absolutely necessary to have all five scales to have a complete, comprehensive learning environment," says Ellis.

If the spaces are located conveniently, they will draw students from all over campus and keep them there long after their classes are over.

"Any time, night or day, every single nook is full of life," says Charles Weiss, grants officer at College of the Holy Cross, about their new Integrated Science Center. "There is a vitality that is palpable."

Large-scale spaces, such as commons or atria, account for slightly more than 21 percent of the net area programmed for informal learning. A massive interior space can be expensive and impressive-looking but largely ignored by the occupants if it is not designed with interaction in mind. A lot of a space's success revolves around food. In fact, science students say it is the food that keeps them in the building after class, and that is what attracts non-science students in the first place—as long as there is also a comfortable space for them to study both individually and in groups.

At Swarthmore College, for example, EYP designed a centrally located atrium to bring together the occupants of three science buildings in one new Science Center. The atrium, bathed in natural light, is an inviting space with tables that seat eight, comfortable armchairs with smaller tables, and a café and coffee shop.

In addition to attracting the building's occupants to a common space, atria can also draw the greater campus into a building. Hamilton College had a beautiful 1920s-era stone structure fronting the quad. The problem was that it looked more imposing than inviting.

The building was shaped like a narrow horseshoe with its arms pointing toward the campus. A new glassed-in commons between the arms now lights up the front of the building, revealing the historic structure behind it while inviting people to enter.

"It has a spectacular vista of this quadrangle that was effectively unutilized," explains Ellis. "The creation of a new, large welcoming presence for science on the quadrangle completely transformed not only the spirit of science, but also how welcoming that complex was to students." On the other end of the size continuum are *student study spaces*, which range from very small spaces for a couple of students to areas that can accommodate as many as eight. On average, more than one-third of the soft space in interdisciplinary science buildings is designed as student study spaces. They may be located adjacent to larger commons, creating a perch that allows students to see and be seen. At Hamilton, they come in the form of small open balconies overhanging the atrium. Likewise, at Assumption College, glass enclosures in the corners of a two-story loft overhanging the commons allow students to commandeer the spaces and not worry about disturbing other people.

"You heard the students from Holy Cross say that people are hanging out there who aren't even science majors," says Ellis. "They want to come in this building and use it. Those spaces become extremely valuable assets for the whole campus."

Departmental or discipline lounges are defined differently among institutions, and sometimes even in different buildings within the same school, but generally are targeted for use by a specific population, and they usually have doors that shut. The need for these lounges has changed as buildings have become more integrated, and the different disciplines have become less often separated by pavilions or floors, explains Ellis. The amount of space dedicated to departmental lounges has been dropping in recent years, as buildings become more interdisciplinary. On average, they account for less than 9 percent of the soft space.

Faculty/student "breakout" space, located within a suite of faculty offices, provides an area for faculty to meet with students and colleagues. Because the space is shared among faculty, it allows their individual offices to be smaller. This kind of space accounts for an average of 19 percent of the soft space EYP studied, and the percentage is trending upward.

Write-up space in research labs is also becoming increasingly popular. The 1950s liberal arts model was to include write-up desks in the back of a lab that was dedicated to a single faculty member and maybe a small number of colleagues. In the past 10 years, the trend has been toward more flexible and adaptable research space, with the current average of 18 percent of all soft space dedicated to write-up discussion space to support research.

New York University has glassed-in write-up space located between biology wet labs. At the College of the Holy Cross, the write-up spaces, which are accessed through a corridor, have windows looking into the research labs.

Successful spaces

Kamal and Ellis examined the College of the Holy Cross Interdisciplinary Science Complex to measure the impact of informal spaces relative to the following:

- Creating a welcoming place to congregate, study, and learn
- Promoting interaction among students and faculty
- Enhancing students' interest in, and attitude towards, science

They found several common themes when they surveyed 500 science and non-science students to understand how and why they were using the informal learning spaces in that Complex. Perhaps the most significant insight from the survey was that students are indeed

using the student study lounges, atria, and other informal spaces to meet and study with other students, study alone, or meet with faculty.

Many students said that in addition to food, good lighting was a main reason they choose to spend time in a particular area. Another is convenience, supporting the belief that the spaces need to be located purposefully according to the way students move through the building.

"If you don't have food, and it is not convenient, according to the survey, they might not use it," says Kamal.

Another important feature is good acoustics: It can't be too loud or distracting, which is most important in very large spaces like atria and commons.

"You can drive people out of a very well-lit, beautiful atrium if it is very noisy, and people don't feel comfortable studying there," says Kamal.

It also must be equipped with comfortable furniture, as well as tables for spreading out work.

"Most atriums cost about \$1 million dollars," says Ellis. "If you are going to spend that much on a project, it's worth your while to make sure it has all the things it needs to be successful on your campus. Otherwise you have spent a lot of money and no one will want to hang out there."

Weiss calls the design of the Integrated Science Center at Holy Cross "absolutely transformative. The old science building was so cold, so sterile; people came in, did their courses, and left as soon as possible. It used to be off limits to admissions tours. I listen to the people on tours now, and they get emotional about what they see here. They see science going on everywhere."

By Lisa Wesel

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Write-up spaces at the College of the Holy Cross are accessed through a corridor and are equipped with windows looking into the research labs. (Image © Robert Benson Photography)



Student study spaces at College of the Holy Cross overhang the commons, allowing students to see and be seen. (Image © Robert Benson Photography)



Hamilton College constructed a glass commons to transform an imposing stone structure into an inviting welcome to the science building. (Photos © EYP Architecture & Engineering and Woodruff/Brown Architectural Photography)