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Liquid labs: Designing for collaboration

Thu, 10/09/2014 - 11:45am by Jinhee Lee, AAIA, Carlos Perez-Rubio, LEED AP BD+C, and Ken Mohr, Principal, HERA



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An artistic rendering of collaborative space at Southern Illinois Univ. at Carbondale, McLafferty Annex. Circulation is directed via walls, changes in flooring and the placement of workstations. Views into lab areas draw attention and pull visitors through the building via a "pinball" effect. The workstations can thus be viewed as dropped leaves or flowers along the circulation "river."

Images: HERA Laboratory Planners

Interdisciplinary collaboration has become paramount to academic and corporate-based research. Collaboration is likely to occur only in an environment that enables and enhances interaction among researchers. Departing from the traditional lab environment, a "liquid lab" design maximizes the adaptability of a space, the fluidity of the changing research and the researcher's access to collaborative space. Such spaces encourage cross-pollination among disciplines, setting the science free from departmental divisions and allowing ideas to mature and breed beyond an individual. A diversified design that's fluid, flexible and fosters interdisciplinary collaboration proves to drive innovation.

Degeneration

An abundance of natural light, operable windows, task lighting, workbenches and ample aisles characterized Thomas Edison's iconic lab. Edison didn't work isolated in a secluded office, but rather surrounded by peers and students collaborating to uncover new breakthroughs in science. His lab was rich in varied supplies in order for every researcher to conduct work no matter their discipline. Because this great scientist had an environment for collaboration, it makes sense that he arrived at the answers to his questions more efficiently. He was a pioneer not only in his field, but also in lab design.

In contrast, maximum efficiency and low cost are the driving forces behind most lab design and planning. Symmetrical floorplans with double loaded corridors, compartmentalized by field and outfitted with universal casework, characterize these standard labs. Fixed benches and utilities limit scientists to their individual workstation and hinder them from working in teams. Traditional lab design has resolutely adhered to this concept, despite its room for improvement. Today's labs, while cost effective, are remarkably severe and not well suited to collaboration.

Why is the status quo reverting to sterile, assembly-line labs rather than advancing lab design by adapting the success of our predecessors? This article conveys solutions to the issue of modern collaboration through the formation of liquid labs, which combine the efficiency of traditional lab design and the innovation of collaborative thinkers.

Interdisciplinary interaction

Modern research labs need flexibility while maintaining efficiency to create an environment conducive to collaboration. Researchers gain a holistic perspective of their field when interacting with one another. While working with colleagues in related fields is widely accepted by researchers, collaboration among those in differing fields is atypical and not often supported through standard lab design. Challenging researchers to collaborate across disciplines, despite their initial reluctance, has led to the creation of new fields of study not defined 20 years ago.

Encourage collaboration

Researchers may naturally oppose this focus on collaboration. However, good design practice will extend guidance to those in

opposition and provide fluid transition into natural collaboration with little effort. This encouragement breaks down artificial barriers, such as titles and departments, and provides enhanced opportunities for thoughtful contributions from group members. Placing one collaborative area per floor is conducive to people on the same floor sharing ideas, but the discussions wouldn't likely transcend between floors. In contrast, strategically placing distinct pockets might entice users to explore other floors. In cases restricted to a single floor, these unique pockets will act as a temporary home. At the Univ. of Chicago's College of Medicine, offices are located in a different wing of the building, requiring some researchers to walk a hefty distance. By carving various-sized niches from an otherwise straight, sterile corridor, users may stay close to their lab while having an escape from the noise and hazards of the lab. These temporary homes must be outfitted with comfortable interiors that lend themselves to informal gatherings and presentations. Users may even draw concepts or take notes on the walls covered with erasable-surface paint. Researchers will feel welcomed and encouraged to stay in the collaborative space due to the warm textiles and furniture that emulates a living room.



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An artistic rendering of the Core Instrumentation Lab at Southern Illinois Univ. at Carbondale, McLafferty Annex.

Shared resources

Collaborative environments offer the ability to share resources. The sharing of instrumentation is economical; there's no need for each individual to possess instrumentation that is rarely used. Sharing instrumentation also allows researchers access to supplies not otherwise at their disposal. An individual researcher might not be able to afford specialized instrumentation, but a group can pool resources to suit their collective needs. Resources dispersed throughout the lab releases researchers to use all of the space with comfort. This form of flexibility is at the core of modern labs.

Flexible workstations

As technology, techniques and lifestyles change, the lab must learn to adapt. Casework configuration is the most prevalent alteration in the modern lab. While a strong argument for fixed casework in certain labs remains, the ability to have easily reconfigurable setups has proven advantageous. Knee opening locations, mobile pedestals and removable bench tops are the most prevalent trends. These flexible workstations lend themselves to teamwork in which each member brings his own surface to the group for optimum efficiency. Stations can also be modified to adapt to the needs of a specific research project or specific researcher. The old adage "one size fits all" is not always correct.

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Group and contain utilities within walls, floors and ceilings to maximize such flexibility. This allows easy access during future renovations and retrofits while minimizing any disturbance to the existing building or adjacent labs. Access chases, valves and items requiring general maintenance are kept outside of the lab envelope. When unavoidable, umbilicals may be embraced within the lab space by assigning them a practical purpose. Containing stray cords within an acrylic surface that's writable and erasable creates a collaborative writing space. This semi-transparent fixture also optimizes visibility and creates a more open environment.

Visibility

An air of inclusion maximizes the available space and develops a collaborative environment. Where seclusion was encouraged in previous lab designs, it's now essential for colleagues, prospective students and clients to see what's occurring throughout the space. Windows leading into labs from exterior corridors invite visitors to participate in the work within. For work that requires more privacy, semi-transparent acrylic surfaces may substitute for solid walls. Views to the outside—a visual link to the daily cycles—confirms improved worker attitude, thus increasing productivity. Visibility is an important factor for safety, morale and teamwork.



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An artistic rendering of the collaborative space at the Univ. of Chicago College of Medicine.

Good design doesn't have to break the bank. Value is in selecting standard casework, equipment and details. Standard mobile benches are more economical than custom designs, but still offer options. Grouping standard benches together can create a custom pattern suitable for the space, while allowing for easy redesign. Practical material selection can assist in extracting the most from a budget. Consider what's appropriate for each individual setting. For instance, directional airflow indicators at lab entrances have many available features that may not be necessary for a space. An electronic sensor with a touchscreen might be overly ambitious for a lab that doesn't request a visual indicator. Understanding the needs and desires of a client is key in achieving cost-effective solutions. While designing labs for optimum efficiency is initially less expensive, design which fosters collaboration and engagement across disciplines is crucial to innovation, future success and funding.

Case study

New learning methodologies were the driving force behind the teaching and research labs at the retrofitted Interdisciplinary Research Center at Southern Illinois Univ. in Carbondale, Ill. The lab emphasizes the adaptability of the space, the fluidity of the changing research and the nature of the founding research programs: Organismal Research Aquatic Center, Fermentation Sciences and Wet and Dry Core Instrumentation Lab. The 65,500-sf McLafferty Annex, retrofitted into a new state-of-the-art research facility, highlights the components of liquid labs. One level houses multiple researchers with varying disciplines. These occupants share facilities, supplies and ideas. In each division of the space, standard codes and equipment are present so that any researcher, regardless of discipline, may work successfully. Large glass surfaces allow outsiders access to the research within and provide an optimal learning environment. Informal collaboration is encouraged by the transformation of interior walls into writeable surfaces.

Although not custom ordered, the lab interiors don't reflect an expected display of double-loaded corridors or fixed benches. These traditional catalog pieces have been modified into organic forms to encourage discussion amongst researchers.

Set on casters, these fixtures roll into new formations within minutes. Restructuring the traditional lab environment, typically thought of as separate and confined, has transformed the facility at Southern Illinois Univ. at Carbondale into a collaborative space to meet today's learning needs.

Conclusion

Collaborative spaces offer the flexibility necessary in the modern world while maintaining the efficiency of traditional design. Liquid labs lead to collaborative work structures, thus encouraging the breaking down of barriers and the sharing of ideas. Professionals engaged in collaboration are focused on finding solutions rather than identifying with a job title or department. This concept of cross-pollination among research disciplines may lead to an increase in grant funding. Through liquid labs, professionals unite across disciplines to share their vision for the good of science.

At HERA, Jinhee Lee specializes in design of lab amenities for animal health and research facilities. Carlos Perez-Rubio specializes in design of teaching and research labs and animal facilities. Ken Mohr, principal, has extensive planning expertise focused on analytical, research and highly technical labs for public and private clients.

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