

## **Future-proofing Science and Engineering Facilities: An Analysis of Strategies**

### Approach with SCUP

As a registered architect and a member of SCUP, my work has been ingrained with integrated planning best practices. The most successful projects identify and involve all stakeholders as early as possible: from the senior administrators and facility managers to the faculty and students to the full design team and custodians. Each person involved with the life cycle of a project has unique drivers and valuable insight, and I find the cross-communication of these drivers to be absolutely critical in science facilities. Integrated planning also implies an understanding of context both on the campus and throughout the field of academic science.

I plan to use my network within SCUP and past collected data as a resource for my project, and I hope to contribute a clear reference that can be used as a benchmarking and methodological tool for my fellow planners.

### Goal

A recent question in my office: How often do researchers actually reconfigure their spaces, and is it worth the additional upfront cost to install a flexible system? I began looking for data to back-up the base assumption that flexible is inherently better and found a gap. There are many designer-driven articles on the wonders of adaptable systems, but I could not find a consensus among university peers regarding the long-term cost of ongoing renovations vs. the long-term effect on user functionality. My goal is to develop a solid research project that looks backwards at recent past projects and forwards at approaching trends from a university perspective. This effort will not only inform future planning efforts in science and engineering facilities, but can also be applied to other flexible systems (eg. classroom furniture or demountable walls).

### Methodology

The planning of science and engineering facilities take into account so many components and building systems, that I propose to look at them one by one through case studies and lessons learned. For example, what is the functional return on an open flat slab construction or an overly generous grid of lab piping? In a post-occupancy assessment of buildings with these strategies, would their stakeholders make the same decisions? There is a line where the cost of flexibility exceeds the potential benefits, and I will attempt to identify the tipping point.

The building components and their various strategies for enabling flexibility can then be mapped against various types of facilities. A preliminary matrix may look like:

		TYPE OF FACILITY					
		Life Sciences	Physical Sciences	Engineering	Teaching/ Class Labs	Core/ Shared	Maker/ Incubator
STRATEGIES	Program						
	Structure						
	MEP Systems						
	Lab/Support						
	Casework						

Each strategy will receive a score based on: relative upfront cost plus average renovation costs plus apparent functionality plus a sustainability factor plus a culture factor, with a more collaborative or avant garde culture earning a higher score.

Example questions for exploration:

- What is the average cost of recent renovations (and disruption to the users) in a more fixed environment weighed against the average cost and time of renovations in a more adaptable, open environment? How does this compare to the upfront costs?
- From a user perspective, is a flexible space seen as an asset that can be converted with ease, or an impediment that doesn't function as well as a more customized space?
- Are flexibly planned systems increasing the efficiency and utilization of a building in order to offset upfront costs?

This data would come from assessments here at Brown as well as from colleagues I've already begun speaking with at institutions such as Harvard, Northeastern, UMass, Stanford, and UCSD. I will expand the discussion by engaging with new contacts at SCUP-North Atlantic in New York and SCUP-51 in Vancouver.

I will also work closely with faculty members and students in the sciences to accurately portray their assessment of "functionality" and also to have them check the rigor of my scientific method.

### Outcome

My working theory is that different types of facilities will vary in which strategies provide the most valuable return. The intent is for a working methodology that can be used to benchmark and plan various spaces at many types of institutions from liberal arts to Tier-1 research.

### Deliverable

A white paper complete with case studies, lessons learned, and benchmark data will be assembled. I also foresee an interactive panel discussion at an upcoming SCUP conference. Participants could guess at which strategies prove most valuable, and relay their own attempts at future-proofing their facilities.