PROJECT DESCRIPTION

Allan Price Science Commons & Research Library
Remodel & Expansion

Campus Planning and Real Estate
University of Oregon
January 2014
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Allan Price Science Commons & Research Library Remodel & Expansion

PROJECT DESCRIPTION

Contents

I. Introduction & Project Overview Pg 2
   Project Description
   Big Idea
   Key Goals
   Funding
   Work to Date
   Procurement

II. Types and Amounts of Spaces Pg 6

III. Project Site and Context Pg 7

IV. Science Commons Project Policies and Process Pg 11
   Campus Plan
   Policy 1: Process and Participation Pg 12
   CPC Meeting 1 Comments
   Policy 2: Open-space Framework Pg 15
   Policy 10: Sustainable Development Pg 16
   Policy 11: Patterns Pg 17

Appendix
   Floor Plans
I. Introduction & Project Overview

Project Description

This document describes the University of Oregon Allan Price Science Commons and Research Library Remodel and Expansion Project (the Project) as the university best understands it at this time. As such, it serves to inform the prospective architects about the Project as well as to start the relationship among the university User Group, associated campus stakeholders, and the design team that is ultimately selected for the Project. The following statements should be a beginning rather than an end.

Big Idea

Information technology has drastically changed the services and configuration of all libraries, but this is particularly true in the sciences. Up until the early 1990s, the curriculum and information infrastructure needed to support the scientific disciplines remained relatively stable. Now, in 2013, the world faces a new array of scientific problems and challenges that are significantly different than those which existed previously. Today’s scientific problems are very much interdisciplinary, requiring extensive use of advanced computing capabilities, access to the most detailed and current data, and facilities that encourage and support collaboration with teams of researchers on campus and throughout the global scholarly community.

As the university continues its substantial strategic investment in the physical and life science, we need a library that supports this direction. A new Science Commons and Research Library is part of the renewed infrastructure necessary to support advanced research and problem solving in a variety of scientific disciplines. The facility should be designed to promote collaboration, experimentation, and investigation. It will further help to strengthen our tradition of interdisciplinary research by drawing students and faculty from across the scientific disciplines, centers, and institutes to a common space that includes the most sophisticated information technology and the rich collections that constitute the foundation for learning and new research.
Key Goals

**Outreach / Interaction /Community**
Create a Science Commons that is the cultural heart and central to the UO science community and integrated (both virtually and physically) with the community as a whole.

**Supporting Science Study and Research**
Create a variety of study and research environments that allow for engagement, interaction, collaboration, and quiet study.

**Services, Instruction and Content Visualization**
Provide instructional spaces that support knowledge creation, foster the interaction of Science Commons staff, students, and faculty, and promote science literacy.

**Information Resources**
Facilitate access to information in all formats, providing support for ease of access to available resources, and engaging in active outreach to the UO community and beyond.

**Environmental Enhancement**
Design interior space with qualities that attract use and contribute to increase productivity.

**Site Repair**
Enliven and beautify the plaza (Onyx Green) and at the same time remedy on-going leakage problems.

These key goals are expanded upon and supported by *Campus Plan* and User Group patterns - the Project’s “pattern language” - as listed and described in the *Campus Plan* section of this document.
Funding

The total project estimated cost of the remodel and expansion is $16,750,000. The project is fully funded through gifts and bonds to be issued by the State of Oregon. We expect approximately $10,000,000 of the funds will be available for direct construction.

Work to Date

The UO engaged design and planning consultants to create two studies:

- Conceptual Design Study, Allan Price Science Commons & Research Library, PIVOT Architects, June 2013

UO Campus Planning & Real Estate led study:

- Northeast Campus Diagnosis, September 2012

These documents are available at: http://uplan.uoregon.edu/projects/projects.html

Note: Many projects begin with preliminary work, such as a conceptual design study, which, as its title suggests, is conceptual in nature. Such studies describe construction or program needs so that funding can be identified. Such studies usually are conducted without broad campus-wide input (although most include broad input from the expected project users) and do not address campus-wide issues such as those enumerated within the Campus Plan. These studies will serve to inform and provide guidance for the UO and the architect's design team, but are not binding.

Procurement

In close step with the architect hiring process, the UO will hire a construction manager/general contractor (CM/GC), who will provide preconstruction services (cost estimating, analysis of construction constraints, materials and systems, and constructibility reviews), and obtain subcontractor bids through the CM/GC process.
<table>
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<th>Seating</th>
<th>Quantity</th>
<th>Unit</th>
<th>Flip/Tilt Net Area</th>
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Allan Price Science Commons & Research Library
University of Oregon
Page 5
II. Types and Amounts of Spaces

Currently the Science Library occupies a total area of approximately 28,900 sq.ft. below grade space beneath the plaza level of Onyx Green, including areas in adjacent buildings Onyx Bridge and Cascade Hall. The Project is an extensive remodel of this existing space along with a modest expansion projected to be 3,000 – 3,500 sq.ft.

The Vision Statement (May 2011) started the investigation into the space needs for the Project. The Vision Statement analysis was revisited in the Conceptual Design Study (June 2013) and reviewed by the Project User Group. The program published in the Conceptual Design Study was refined by the User Group to reflect the current understanding of the space types and amounts. The User Group expects revisiting the space program elements with the architects in the beginning of the design phase for the Project.

Program element descriptions:

- Double the total seating capacity, from approximately 250 to 520 seats to address a 71% increase in science majors since 2001.
- Double the space/seating for classes, seminars, and group study, from approximately 72 to 158.
- Add network and power capacity to address growing demand for connectivity.
- Add a new Digital Technology Lab, approximately 20 seats.
- Create newly-configured instructional spaces to support collaborative work and problem-based learning.
- Flexible study spaces, e.g., movable walls and furniture that can be reconfigured easily to accommodate teaching/learning requirements.
- Add two to three discipline-specific rooms with resources to support discovery and learning. The model is the highly successful anatomy resource room in the current library, which is used heavily by students studying human physiology.
- Create additional space for student advising, in collaboration with the College of Arts and Sciences.
- Plan for tutoring and group study space that supports high-level technology.
- Provide new technologies to support data-intensive disciplines including visualization capabilities.
- Provide new teleconferencing services to support distance instruction and to enable better connections with the global scholarly community.
- Establish gathering/event/display space that is central and flexible.
- Include a cafe area to facilitate interaction and connection with the science and general campus community.
- Create a service “hub” - a starting point for facility users and visitors.
- Provide for a 50% reduced print collection while maintaining an easily accessed browsing area.
II. Project Site and Context

The Project site is positioned near the heart of the Lokey Science Complex, the most densely built sector of the campus. Statistics for this campus design area show approximately 962,500 gsf of built floor area and 227,000 sf of coverage. The maximum allowed floor area ratio (FAR) for this area is 1.7, leaving about 24,000 gsf left for development. More importantly to our project is the 40% allowed coverage, with only 5,000 sf remaining.

The site is situated along an important and well traveled bicycle and pedestrian pathway that links the main campus to the north campus across Franklin Boulevard. The intersection of this pathway with Franklin Boulevard holds great potential for a campus entry gateway, particularly when considering the replacement of Onyx Bridge has been deemed imminent. The replacement of Onyx Bridge will also afford the opportunity for views into campus along the Franklin Boulevard corridor.

The southern end of the bike/ped pathway terminates at 13th Avenue. The Erb Memorial Union (EMU) project will be making significant modifications on the south side of 13th providing an opportunity to plan for and create a pathway/entry node.

13th Avenue also appears to be the only viable open construction access point to the plaza, not withstanding the significant landscape. There is no vehicular access directly onto the plaza from the east or west, and the approach from the north is interrupted by a skybridge joining Klamath and Onyx Bridge and Onyx Bridge itself. Once reaching the plaza the bearing capacity of the slab is reported to be minimal. These factors may influence the type of construction and materials selection.
1. Pedestrian, bike, and vehicle conflict.
2. Pedestrian and bike pinch point causes conflict.
3. Poor pedestrian access to main building entrance.
4. Portion of 13th Axis does not feel pedestrian oriented.
5. Poor pedestrian access along portion of Franklin Edge.
6. Interior portions of Science Walk do not provide clear views through the buildings--many do not know that the walk is continuous.
7. View of path destinations obscured.
8. Interior pathway system is well used by occupants but unclear to those who do not work in the area.
9. Wind tunnel.
10. Poorly marked main building entrances.
11. Franklin Boulevard forms a barrier to North Campus.
12. Path layout does not conform to desired lines.
13. Restrictive and unattractive pathway at desirable North/South pedestrian routes.

Policy 2: Open-space Framework
- Main Building Entrances
- Path Shape
- Paths and Goals
- Pedestrian Pathways
- Site Repair
- Universal Access
The plaza itself has always held great potential as a primary outdoor gathering place— and is in fact a campus designated open space called Onyx Green— but stark treatment in the design and materials render it a fairly bleak area made of concrete surfaces. There is also a significant amount of covered bike parking bordering the north and east side of the plaza’s sunken courtyard opening. Should this parking be displaced in the development of the project design, it will need to be replaced in the immediate area. The expansion of the Science Commons is expected to provide a notable presence at the plaza level and planning and design to bring new life to the plaza and adjacent connections will be included in the design process.

Secondary pathways also lead to and through the plaza or along its edges, including the “Science Walk”, a east/west walk along the south edge. However, the life of the Lokey Science Complex happens largely in the upper floor internal connections between buildings.

The Science Library is subterranean, located below Onyx Green (plaza) and bordered by buildings on all sides. It was initially built as part of the Klamath Hall construction in 1967 with the main entry contained blow Onyx Bridge (Onyx Bridge was completed in 1962). Cascade Hall was occupied in 1990 and the Science Library extended into its basement level. There are direct openings or passageways to all three of these buildings. Willamette Hall was also built in 1990 and is joined indirectly to Klamath Hall at the basement level, but there is no direct connection to the Science Library. The library’s sole source of daylight is through the plaza’s sunken courtyard.
III. Science Commons Policies and Process

Campus Plan and Policy Framework

The Campus Plan contains a policy framework to guide the development of the University of Oregon. The Campus Plan is a process for making development decisions on an on-going basis rather than a static fixed-image master plan; given that the exact nature and magnitude of future changes cannot be predicted with any degree of certainty, and object-oriented plans based on explicit assumptions about the future become outdated as the “future” becomes known.

Policies, which apply to all projects within the Campus Plan’s jurisdiction, describe the University’s requirements with respect to physical development and the application of the Campus Plan to projects.

Campus Plan Policies:

Policy 1: Process and Participation
Policy 2: Open-space Framework
Policy 3: Densities
Policy 4: Space Use and Organization
Policy 5: Replacement of Displaced Uses
Policy 6: Maintenance and Building Services
Policy 7: Architectural Style and Historic Preservation
Policy 8: Universal Access
Policy 9: Transportation
Policy 10: Sustainable Development
Policy 11: Patterns
Policy 12: Design Area Conditions

Four policies are explored more thoroughly in this document because of their relevance to this project and its planning process:

Policy 1: Process and Participation
Policy 2: Open-space Framework
Policy 10: Sustainable Development
Policy 11: Patterns

Please refer to the Campus Plan for the full text of each policy.

A copy of the Plan is available at: http://uplan.uoregon.edu/plandoc/CampusPlan/CampusPlan.html
Policy 1: Process and Participation

The structured and effective manner in which the university’s planning process functions stems from the principles described in _The Oregon Experiment_. The cornerstone of the process is the principle of participation, which is an extension of an established tradition in Oregon generally and at the University of Oregon in particular.

The process is designed to ensure that:
• meaningful opportunities exist for participation in the planning and design process,
• decisions are based upon a policy framework that preserves and enhances the essence of the campus as described in the _Campus Plan_, and
• planning decisions are coordinated and based upon overall institutional objectives.

Participation

The User Group is the primary client representative in the design process and is appointed by the Campus Planning Committee chair. Unlike user committees at many other institutions, a UO User Group is actively involved as a partner in the design process. Its involvement includes developing organizational approaches, generating design concepts, prioritizing needs, comparing building systems, and discussing cost and budget trade-offs. In addition, the User Group may appoint Special Area Groups to address specific programmatic needs at different points in the process. Informational meetings and comment sessions for the university community will also be instituted.

The Project User Group will advise on project matters related to design and programming. The group consists of faculty, staff, and student representatives from the Knight and Science libraries, the science departments, a neighboring building representative, a School of Architecture and Allied Arts representative, and a Campus Planning Committee representative.

Since the members of the User Group are all active full-time members of the UO community as students, faculty, and administrators, it is essential to use their time in ways that are both efficient and meaningful. It is equally important to establish effective communications and a collaborative atmosphere among the User Group and the design team.
Participation continued:

Several measures will support those goals:

- Campus Planning staff’s role as meeting facilitators and visual note takers will continue through the Schematic Design phase;
- A normal meeting cycle will begin with agenda setting and materials (agendas, design information, draft images and other materials) distributed in advance;
- Meetings will start and end on time unless specifically extended by the User Group;
- There will be a review of relevant policies and patterns before each design discussion;
- The design team and User Group will develop concepts in interactive workshop settings;
- Decisions will be made by specific, deliberate actions of the User Group;
- The last five minutes of each meeting will be devoted to a recap of the meeting’s decisions and the directions the Project will take before next meeting;
- The design team will provide copies of electronic files and paper presentations to Campus Planning, to be made available to the User Group;
- Meeting notes will be distributed within one week in summary form.

The user involvement process will also include working with specific subject area users as well as meetings for broader audiences to communicate with various campus constituencies.
CPC Meeting 1 Comments

On October 22, 2013 the Campus Planning Committee met with Project representatives. The committee unanimously agreed to recommend to the president the following actions related to the Allan Price Science Commons & Research Library Remodel & Addition Project:

A. Support the identified CampusPlan patterns and policies for the project with the understanding that the following comments will be considered as the project moves forward:

1. Assess connections to and the impact on adjacent open spaces (north and south of the site) prior to siting the addition and throughout the design process.
2. Consider ways to integrate potential improvements to adjacent landscapes and pathways into the project.
3. Explore ways to resolve pedestrian/bike conflicts along the bike route (from Franklin Boulevard to 13th Avenue), particularly where the pathway enters the plaza.
4. Consider future redevelopment options (e.g., replacement of Onyx Bridge, open-space reconfiguration, pathway improvements, new main entrance at Franklin and Onyx, enhanced connection across Franklin Boulevard to ensure the project does not preclude potential future improvements.
5. Carefully consider daylighting options.
6. Investigate opportunities to enliven the plaza, paying particular attention to the open-space edges (e.g., Klamath Hall).
7. Investigate ways to make the plaza more inviting, for example, soften the plaza’s hardscape and add seating.
8. Ensure that any proposed changes to landscape and circulation are coordinated with the proposed 13th Avenue improvements associated with the Erb Memorial Union Expansion and Renovation Project (e.g., pathways, street crossings, building entrances, etc.).
9. Consider adding “Courtyards Which Live” as a project-specific pattern.
Policy 2: Open-space Framework

The University of Oregon campus is organized as a system of quadrangles, malls, pathways, and other open spaces and landscapes. This organizational framework works well and serves as a physical representation of the university’s heritage.

The framework policy calls for the preservation, completion, and extension of open-space framework through a series of dedicated open spaces upon which the construction of above-ground buildings is prohibited. Additionally, university projects are bound by requirements outlined in the Campus Plan to enhance adjacent open spaces or to create new open spaces.

The Project site is located under the Onyx Green (plaza), a campus Designated Open Space near the center of the Lokey Science Complex. It is contained within the Academic, Research, and Support Services Design Area, bordered by the 13th Avenue Axis to the south and Franklin Boulevard axis to the north. Description of the Academic, Research, and Support Services Design Area can be found in Policy 12 of the Campus Plan.

The Design Area description addresses three “Opportunities and Constraints” of note for Onyx Green. They are: Proposals that enclose the opening to the Science Library by creating a new building over the opening or creating an additional entrance to the library are acceptable; the replacement of buildings that form the edge of the plaza (in particular Onyx Bridge) must provide for the continuation of the pathway and bicycle connections to Franklin Boulevard; and building replacements may slightly adjust the plaza’s shape, but should not significantly reduce the size of the plaza.

The anticipated new Science Commons entry and expansion will impact the Onyx Green Open Space. A significant new building component is not anticipated – approximately 3,000 - 3,500 square feet. The entry/expansion, coupled with site and open space enhancements, has the obvious potential to leave a significant impression on Onyx Green (the plaza).

The highly utilized north-south bicycle and pedestrian pathway, along with the numerous pedestrian routes through the site area, are important aspects of the open-space framework and are described in more detail in the Site and Context section of this document.
Policy 10: Sustainable Development

In addition to the legal and policy mandates that apply to this Project, the UO will, early in the design process, engage the design team and CM/GC in an integrated design process to describe specific areas of environmental concern; to identify strategies to address those concerns; to set environmental performance goals; to agree on areas needed for research and decision-making; and to establish methods and metrics to predict the building performance relative to those goals. As the Project develops, we will revisit the strategies and their predicted performance and possibly revise or choose among strategies based on performance data. The UO expects to be an active participant in all phases of these discussions through policy and user-related decisions in the context of the User Group supplemented by staff support on technical details.

The Project is required by the adopted UO Oregon Model for Sustainable Development (OMSB) to seek LEED Gold certification. The UO is comfortable with using LEED as a rating system, but prefers to make each green building decision (in conjunction with the design team and CM/GC) on its own merits relative to the UO’s environmental ethics and goals. As discussed above, these decisions are most effectively made early in the design process, allowing for the early integration of solutions rather than applying them after the fact. The design team must possess the skills to function as an equal partner in this process and to understand fundamental green building issues – not simply current industry-standard approaches to sustainability.

The LEED Gold certification and environmental performance goal efforts will be in accordance with, and occurring in parallel with, other criteria in the OMSB, chiefly achieving a high energy performance level termed the Advanced Energy Threshold (AET). The AET is defined as 35% more efficient than the Oregon Energy Code requirements.
Policy 11: Patterns

Patterns are statements about the built environment that describe and analyze design issues and suggest possible ways to resolve them. Articulating long-lasting, shared traditions and understandings that adapt well to development needs, patterns emphasize long-range planning and continuity of development decisions over time and at the same time enable user groups to respond quickly to opportunities for facilities improvements as they emerge.

Each pattern consists of a title, identification of an issue, perhaps a discussion or analysis, and a policy statement. It identifies the essence of an issue and suggests ways to resolve it. Certain issues may involve more than one pattern; however, not all problems that need to be resolved are covered by patterns. Finally, the solution suggested by a pattern may not be the only answer. In these cases, the pattern must be edited or rewritten to reflect the specific needs of the project.

Following is a Pattern List - a Pattern Language for the Allan Price Science Commons & Research Library - a list of the applicable patterns from the Campus Plan and developed by User Group. This list is intended to be a living document, and more patterns may be added as necessary.

Some guidance:
- Bolded patterns are required to be considered for all projects;
- See the Campus Plan for the full text of the Campus Plan patterns;
- An asterisk (*) indicates the pattern was developed by the User Group.
- Descriptions for the User Group patterns and a number of particularly relevant Campus Plan patterns can be found on the pages following the comprehensive list.

**LARGE SCALE CAMPUS**

Campus Trees
Main Gateways
Open-space Framework
Open University
Outdoor Classroom
Promenade
Quadrangles and the Historic Core
Sustainable Development

**Universal Access**
University Shape and Diameter
Welcoming to All

**TRANSPORTATION**

Bike Paths, Racks, and Lockers
Local Transport Area
Paths and Goals (also adapt to interior space)
Pedestrian Pathways (also adapt to interior space)
SITE ARRANGEMENT

- Accessible Green
- Activity Nodes
- Building Complex
- Connected Buildings
- Existing Uses/Replacement
- Family of Entrances
- Main Building Entrance
- Positive Outdoor Space
- Public Outdoor Room
- Quiet Backs (adapt to interior space)
- Research Ties
- Seat Spots
- Site Repair
- Sitting Wall
- Small Public Squares
- South Facing Outdoors
- Tree Places
- Use Wisely What We Have
- Water Quality

BUILDING DESIGN

- Arcades
- Architectural Style
- Building Character and Campus Context
- Science (Building) Hearth
- Flexible Classroom
- Informal Learning *
- Faculty and Student Mix
- Flexibility and Longevity
- Four-story Limit
- Future Expansion
- Materials and Operations
  - “Start Here” No Signs Needed
  - Quiet and Buzz *
  - Porous Edge *
- Operable Windows
- Organizational Clarity
- Access to Daylight * [Quality of Light]
- A View Outdoors *
- Pools of Light
- Research Display *
- Helping Others *
- Technology Diffusion and Concentration *
- Global Meeting Room *
- Data Visualization *
- No Leaks *
- Wholeness of Project
- Wings of Light
Building Complex
Issue: The human scale vanishes in enormous buildings. People who use them stop identifying the staff who work there as personalities, and the staff feel like small cogs in a greater machine.
Therefore: To maintain human scale in campus buildings, make them small, perhaps no larger than 100,000 gross square feet (with some notable exceptions such as libraries and recreation facilities) and not more than three or four stories high. If more space is needed, the buildings should be conceived as a collection connected by arcades or bridges defining and embracing outdoor spaces.

Existing Uses/Replacement
Issue: All university uses are important to the university. A new use must not benefit at the expense of an existing use.
Therefore: All plans for new development (buildings, landscape, or remodeling projects) shall keep existing uses intact by developing plans and identifying funding for their replacement. (Note: 70 existing covered bike parking spaces on the plaza plus additional covered and secure spaces under Onyx Bridge.

Main Building Entrance
Issue: Placing the main entrance(s) is perhaps the single most important step taken during the evolution of a building plan.
Therefore: Place the main entrance(s) of the building at a point immediately visible from the main avenues of approach, and give it a bold shape in the front of the building. Engage the main paths through the Lokey Science Complex through the placement of this entrance.

Positive Outdoor Space
Issue: In general, outdoor spaces that are merely “left over” between buildings will not be used.
Therefore: Always place buildings so that they embrace the outdoor spaces they form. Design the landscape so that some sides of the outdoor space are defined by buildings and some sides by arcades, trees, or low walls. Be sure to leave entrances to the outdoor “room” at several points so people can pass freely through the space and travel to other connecting outdoors spaces.
**Site Repair**  
**Issue:** Buildings must always be built on those parts of the land that are in the worst condition, not the best.  
**Therefore:** Never place buildings in the most beautiful places. In fact, do the opposite. Consider the site and its buildings as a single unit. Leave as they are those areas that are the most precious, beautiful, comfortable, and healthy, and build new structures in the least pleasant parts of the site.

**South Facing Outdoors**  
**Issue:** People use open space if it is sunny, and they don’t use it if it isn’t.  
**Therefore:** Place buildings so that the open space intended for use is on the south side of the buildings. Avoid putting open space in the shadow of buildings. And never let a deep strip of shade separate a sunny area from the building it serves.

**Science Hearth** *(based on Building Hearth)*  
**Issue:** There is no one space in the Lokey Science Complex which encourages interactions among faculty, researchers, students, and staff from all areas of science to casually or even accidentally meet, to learn from each other, and to collaborate.  
**Therefore:** Create a Science Commons which will be the intellectual, social, cultural, and coffee heart of the sciences to create community, foster interaction, and generally improve both the process and outcomes of learning and practicing science. Plan this space for a wide variety of activities: informal learning, student project development, study groups, static and dynamic displays of current research, journal clubs, semi-formal presentations (similar to Science Pub), and so forth. Plan for coffee and light food service, if possible, to use as a magnet and mixer of all disciplines and levels.  
*see also: Informal Learning, Research Display*
“Start Here”*

**Issue:** A staffed main desk is an essential part of what a learning commons is, but is often built or located to be intimidated or in other ways discourage questions.

**Therefore:** Create a staffed desk to handle various tasks, but which should be clearly seen by users as a resource for getting help with all aspects of the Science Commons. It should be small, welcoming, located to both handle its tasks as well as to visibly attract users to its functions. These may include reference questions, help with technology, checking out equipment and print materials, and suggesting avenues for finding information resources.

Informal Learning*

**Issue:** We now know that much student learning happens outside the classroom, and largely not in an individual setting, yet we haven't fully grasped how to provide places that support this.

**Therefore:** Create informal learning spaces with tools for collaboration spread through many areas: generously-sized tables, rolling white boards, easily accessible digital display systems, some areas with enclosure on two sides, and others fully open to their surroundings. Ensure that these provide for see-and-be-seen opportunities, and locate these facilities to expose students to other features of the Science Commons. Make the technologies very easy to access and very robust.

see also: Research Display, Quiet and Buzz, Flexible Classrooms

reference: Real Learning in Cafés (in The Oregon Experiment)

Quiet and Buzz*

**Issue:** Everyone at different times needs a different level of quiet

**Discussion:** Everyone has his or her own tolerance for noise and for quiet. Some people working alone crave quiet, others need some degree of background buzz as is found in a noisy cafe. The current Science Library is divided into louder and quiet areas by the exterior courtyard. This allows students and researchers seek out the acoustical environment appropriate to what they are doing at any given time.

**Therefore:** Provide areas that are quiet and others that are busy, both acoustically and visually. Make these appear natural through design, minimizing the need for signs and enforcement.
**Porous Edge***

**Issue:** To become a hearth and intellectual heart of the Lokey Science Complex, how must the Science Commons engage users of adjacent buildings and also engage the larger campus?

**Therefore:** Open up the edges of the Science Commons except for the controlled area that will contain the print collections. Treat these porous edges so that they can change over the course of the day and week to reflect the security concerns of the Commons as well as of the spaces it connects to. Use a prominently visible Main Entrance that engages major paths through campus to attract use.

**Access to Daylight***

**Issue:** There is abundant research that learning, as well as other kinds of human behavior, generally improves when daylight is present, yet many learning and research environments have only electric light.

**Therefore:** Maximize access to daylight except where it would conflict with function. Consider each space and program its lighting needs. Provide for these needs through daylight where possible, enhanced by complementary electric lighting, and use these lighting concepts to attract people to the Science Commons.

**A View Outdoors***

**Issue:** Very few people want to spend all day without any view of the outdoors.

**Therefore:** Provide views of the outdoors, preferably including shrubs and trees, to as many parts of the building as is possible. These views can be fairly distant, but try to ensure that full-time employees have access to generous views of outdoor areas reasonably frequently throughout the day. Even where views of outdoors can’t occur, ensure that all occupants have easy access to long interior views for visual relief.
Science Commons Patterns (continued)

Welcoming to All
Issue: Built environments in which the greatest range of diverse people feel welcome and comfortable promote learning opportunities and encourage an open exchange of ideas.
Therefore: Create a campus that addresses the issues of diversity and equity in the built environment, for example, in landscapes, building layout, design details, and artwork.

Browsing Books*
Issue: Electronic resources are wonderful for structured searches, extremely broad, extensive access to materials, and quick turn-around, but they’ve never replaced the experience of browsing in aisles and the serendipity of glancing at the title of a book that grabs your curiosity.
Therefore: Maintain a vibrant print collection designed to respond to this need. Encourage faculty and researchers to use this resource by making the space accessible and pleasant. [this pattern could use more discussion and enrichment before use]

Flexible Instruction*
Issue: Instruction in the sciences is now largely team-based and project-oriented, yet many teaching facilities don’t support these approaches. In addition, classrooms are often called upon for other needs when not in use for formal instruction, and the facilities for instruction sometimes conflict with the other uses.
Therefore: Create classrooms that have an appropriate amount of flexibility that users can manipulate and change without much effort. Models for this type of space include classrooms in HEDCO. Consider making ways to subdivide them after instruction hours so that they can serve as small group study rooms. Provide technology that is easy to access and easy to upgrade as systems evolve. Support small group break-out through appropriate furniture, flat screens, appropriate acoustics, and so forth.
Research Display*

**Issue:** Ideas stimulate new ideas, but if we keep our research hidden from view, we don’t get the full benefit of the advancement of knowledge, and students aren’t inspired by their peers and their mentors to fully engage in learning.

**Therefore:** In research and learning environments, provide a rich mixture of ways to publicly present research. These should include walls for physically posting materials, electronic displays of current research and researchers, and ways to incorporate posters from conference poster sessions. These systems must be located very carefully to maximize engagement, be easy to curate and manage, and be visually-compelling while not competing with the content that they display.

Helping Each Other*

**Issue:** Students learn from each other as much as from faculty, either in informal study sessions or organized peer tutoring or help. Building infrastructure doesn’t always encourage all students to take advantage of this important aspect of their education.

**Therefore:** Provide spaces and infrastructure to best support students helping students. Showcase these activities, and provide a rich suite of tools: white boards, screen sharing, and so forth. Also provide spaces to retreat to at times, spaces which can also be used for other small-group functions. Consider including a “genius bar”, where more advanced students can provide impromptu help.
Technology Diffusion and Concentration*
Issue: It's important in a Science Commons to infuse all parts of it with the appropriate technologies to support learning, inquiry, and interaction. In general, many of these technologies will be spread throughout the Commons. However, technology moves very rapidly, and always has expensive, leading edge elements. On one hand, it's important to provide access to these elements. On the other, access can't be so open that the technology literally walks out the door. Furthermore, many times these most advanced technologies require assistance, but a highly-distributed model works against efficiently providing assistance.
Therefore: Create specific areas to support advanced technologies that are integrated into the overall plan with excellent physical and visual connections with the rest of the Science Commons and which are designed to attract use and to be efficiently-staffed, but which can be operated on a shorter schedule than the entire Science Commons and secured independently.

Global Meeting Room*
Issue: More and more research collaboration happens across long distances. Since an essential part of advancing research is face-to-face communication, as in a weekly research lab group meeting, these distances can be very frustrating.
Therefore: Create environments strongly supportive of distance collaboration. In particular, create meeting rooms at different scales to allow distant groups and individuals to meet as if they were across the table or across the room, using easily accessible technologies that allow faces, screens, data, and sounds to be shared.

Data Visualization*
Issue: Many fields of scientific research generate huge data sets that are difficult to comprehend and analyse with conventional tools and equipment. This research is conducted in groups, increasing the challenge by increasing the needed image size for a group to see and discuss their data. A further obstacle can be visualization software and hardware that requires esoteric skills or training.
Therefore: Create a data visualization facility to provide research groups and seminars a way to display their data in a very large format using computer power appropriate to the task. Success in this facility will come from engaging users to study the current and near-future needs of research groups. Design systems to allow relatively non-expert users to display their data and not rely on dedicated staff.
No Leaks*
Issue: The current Science Library has suffered from years of leaks in the membrane of the ground-level plaza above it. Although the membrane and plaza have been replaced and repaired, new leaks continue to occur.
Therefore: Build the waterproofing systems to be bullet-proof and essentially permanent.

Courtyards That Live (CPC recommended Pattern, extracted from A Pattern Language)
Issue: The courtyards built in modern buildings are very often dead. They are intended to be private open spaces for people to use - but they end up unused, full of gravel and abstract sculptures.
Therefore: Place every courtyard in such a way that there is a view out of it to some larger open space; place it so that at least two or three doors open from the building into it and so that the natural paths which connect these doors pass across the courtyard. And, at one edge, beside a door, make a roofed veranda or a porch, which is continuous with both the inside and the courtyard.
Existing Science Library Floor Plans