Library Teaching & Learning Spaces Task Force

Final Report

"Education by inquiry demands collaborative effort."
Boyer Commission Report

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Executive Summary

The Library's Teaching and Learning Spaces Task Force was appointed on September 25, 2006 and charged with

- identifying relevant organizations, articles, and reports concerned with the characteristics of current and future students, and future trends in both learning and learning space design;
- gathering information about state-of-the-art learning spaces;
- describing activities that might take place in dynamic and engaging library learning spaces and identifying the functionality necessary to support these activities; and finally,
- developing a set of recommendations for UC Berkeley's Library to consider as it positions itself as a campus center for educational, intellectual and creative discourse.

Any investment in UC Berkeley Library spaces should derive every possible benefit of those investments in support of campus teaching and learning.

If they are to be effective and valued, libraries must understand and respond to changes within the larger communities in which they exist. The need for fundamental educational reform as been widely acknowledged within the higher education community as researchers have come to recognize that deep learning results from independent research and discovery, carried out by students, with the guidance of academic mentors. The American Association for Colleges and Universities has urged universities to support reforms in the curriculum by the strategic employment of campus resources *"to support faculty members as they assume the responsibilities for learner-centered education."* (AACU, 2002, p.49)

The Library Teaching and Learning Spaces Task Force believes strongly that any investments in UC Berkeley Library spaces should derive every possible benefit from those investments in support of campus teaching and learning. Today's students want to learn through exploration and are enthusiastic about joining campus learning communities. As teaching and learning becoming increasingly research focused and interactive, instructors will need to collaborate with librarians, instructional design and IT specialists, and other academic partners in the delivery of instruction and students will seek interactive spaces in which to socialize and learn.

In seeking to create learning environments which allow faculty to teach in new and more discovery-based ways, the

"transformed library" becomes a site for out-of-classroom activities and experiences that support a research-based curriculum that is becoming the hallmark of a Berkeley undergraduate education.

Berkeley is noticeably lacking in interactive spaces that serve as vibrant central hubs for campus life, learning and collaboration and yet the importance of such spaces has been recognized in several campus planning documents.

Berkeley is noticeably lacking in interactive spaces that serve as vibrant hubs for campus life, learning & collaboration.

Methodology. In the course of its work, the Task Force conducted an extensive review of the literature and read widely on the design of learning spaces generally and library learning spaces in particular. It also examined all known relevant campus planning documents, including the *Strategic Academic Plan*, *Information Technology Strategic Plan*, *Educational Effectiveness Report*, and IDEO's *Designing Community at UC Berkeley*. It conducted observations of use within Moffitt Library and analyzed the results of campus faculty and undergraduate focus group discussions conducted by the Division of Undergraduate Education.

Members of the Task Force conducted site visits locally, nationally, and internationally, including: Stanford University's Wallenberg Hall; San Mateo Public Library; San Jose State University's Library, Faculty Development Center, Student Success Center, and Incubator Classroom; University of Southern California's Leavey Library; Cornell University Libraries; and the library learning centers at Warwick University, UK.

The Task Force chose to follow the planning framework outlined by Johnson and Lomas (2005) that recommends that designers

- Understand the institutional context;
- Specify learning principles;
- Determine learning activities;
- Develop design principles;
- Create a set of requirements; and
- Provide for ongoing evaluation.

Principles

Over time, the Task Force came to recognize a seismic shift in the learning landscape of higher education. In turn, this informed the development of a set of underlying principles that formed the backdrop for the Task Force's discussions and recommendations. The principles can be grouped around five themes:

Students increasingly desire connection, learn by discovery, and expect customized services. Millennials learn better through discovery. They are highly connected and adapt newer technologies to increase their levels of inter-connectivity, communication, and socializing. They are drawn to things that adapt to their needs and not things that require them to change their habits. Millennials expect the same from university instructional and information services.

Research-based learning sets universities apart from other higher education sectors. Research-based learning is one hallmark of a UC Berkeley undergraduate education. Deep learning results from independent discovery, carried out in social settings, by students guided by faculty mentors and supported by peers and campus academic support units. Research and learning enhance one another and will become increasingly interactive over time.

The advantages of effective partnerships among academic support units are growing. Student learning is a responsibility that is shared by the entire campus. More information exists on learning environments than any one individual or group can hope to understand in its entirety. Success in planning requires a campus culture that facilitates the exchange of information held by everyone. Curricular and co-curricular programs can reinforce one another in supporting a student body of self-directed and research-savvy learners. The University Library must continue to be a key collaborative partner in the delivery of undergraduate education and the enhancement of campus infrastructures for teaching and learning.

Libraries must adapt to changes in higher education. It is unlikely that shelving needs will ever again drive library space planning to the degree that they have in the past. Investments in library spaces should derive every possible benefit to the support of campus teaching and learning. A "transformed library" provides environments and experiences that support inquiry-based activities.

Campuses need dedicated physical spaces that promote interaction, collaboration, and community. The campus *Strategic Academic Plan* recognizes the value of contiguity and the importance of locating the entire academic enterprise on the central campus footprint to foster vital intellectual connections. To further support this goal, the campus needs to create centrally located hubs where services, programs and spaces combine to create opportunities for both formal and informal communities.

Recommendations

Recommendation 1 | Designate Moffitt Library as an initial campus demonstration project for creating a dynamic and collaborative intellectual commons and innovative campus center for teaching and learning. Designate particular areas within Moffitt as sites of experimentation for state-of-the-art technological and design innovations.

Recommendation 2 | Appoint a cross-campus Moffitt Library Planning and Revitalization Committee composed of campus faculty, students, librarians and representatives from appropriate academic support units.

Recommendation 3 | Secure formalized and long-term commitments from appropriate campus stakeholders and control units to collaboratively plan and implement blended learning spaces within Moffitt that support of student-centered teaching and research-based learning.

Recommendation 4 | Collaborate closely with campus technology and IT units to integrate campus teaching and learning support services to the fullest extent possible, locate them conveniently and prominently, provide for their maximum customization, and offer them 24/7 wherever possible.

Recommendation 5 | Provide professional development to staff to enable them to re-conceptualize libraries as proactive teaching and learning centers that are integrated with other campus learning systems and services.

"We in public education must maintain our relevance … by our ability to change. Change requires courage, but change we must. We simply cannot continue to do business the same way that we have been doing it."

(Gee, 1996)

Library Space Planning in the 1990s

HIGHLIGHTS

- Library space planning in the 1990s focused on building storage capacity, not on strengthening library impacts on teaching and learning.
- Fractured campus space planning works against planning that is responsive to the institution's fundamental educational goals.
- Libraries *can* become spaces that facilitate social exchanges in which deep learning occurs.

Higher education overlooked important opportunities to build the community-wide ownership of library planning necessary for making new investments in library space highly productive for learning.

From 1992 to 2001, higher education spent on average $449 million per year on library construction, adding close to 2.9 million gross square feet of library space. (Bennett, 2003, p.3) In 2003, Scott Bennett, Librarian Emeritus at Yale University, published the results of his comprehensive study of academic institutions that built or renovated library space between 1992 and 2001. He found that higher education largely overlooked important opportunities to build *"the community-wide ownership of library planning necessary for making new investments in library space highly productive for learning and teaching."* (Bennett, 2003, p.5)

A traditional view of libraries is that they are sites where information is stored, organized, and managed on behalf of those who use it, where students are taught to master the complexities of print and online information and where clients are assisted in their use of information by library staff. An alternate view sees libraries as *"spaces where learning is a primary activity and where the focus is on facilitating the social exchanges through which information is transformed into the knowledge of some person or groups of persons."* (Bennett, 2003, p.4) The Library Teaching and Learning Spaces Task Force strongly believes that any investments in UC Berkeley Library spaces should derive every possible benefit from those investments in support of campus teaching and learning.

In his Council on Libraries and Information Resources sponsored report Libraries Designed for Learning, Bennett observed that library space planning in the 1990s was often uninformed by modes of student learning or modes of faculty teaching. These, he states, are *"precisely the arenas in which academic library space could have its 'singularly most important outcome' as regards the fundamental mission of colleges and universities."* (Bennett, 2003, p.37)

Bennett asks "whether the goal of libraries might more appropriately be described as supporting collaborative learning by which students turn information into knowledge and sometimes into wisdom."

Scott Bennett
Libraries Designed for Learning

Bennett sought to understand the extent to which library planning in the 90s considered new visions for libraries as sites of learning. He found that long standing library space problems -- notably the need for additional shelving capacity -- consistently captured the attention of planners at the expense of addressing emerging needs occasioned by changes in student learning and faculty teaching. A bias existed in library space planning that favored traditional library services at the expense of the social identity of learning and knowledge. Bennett also uncovered *"a fractured responsibility within the campus community for library space planning, which works against planning that is responsive to the institution's fundamental educational goals."* (Bennett, 2003, p.2)

With the advent of web-accessible information resources, many readers no longer see the need to use the library to discover or make use of information. Many of the library directors that Bennett interviewed *"felt that -- with burgeoning online resources and off-site shelving facilities a possibility -- it was unlikely that shelving needs would ever again drive library space design in the way it had in the past."* (Bennett, 2003, p.12)

With this lessening of pressures to increase library storage capacities, Bennett questions *"whether the goal of libraries today might be more appropriately be described as supporting collaborative learning by which students turn information into knowledge and sometimes into wisdom."* (Bennett, 2003, p. vi) and asks how might we *"make library buildings fit homes for the learning and teaching processes by which knowledge moves between people and its embodiment in printed books and digital resources."* (Bennett, 2003, p.2)

Higher Education Context

HIGHLIGHTS

- The learning paradigm needs broadening from the traditional faculty-to-student relationship to a student-to-broader-community model.
- Deep learning results from independent discovery, peer-to-peer interaction, instructor feedback, and use of IT.
- Millennials seek services and technologies that adapt to their needs.
- The traditional organization of many libraries falls short of student expectations.

Libraries are cultural, social, political and intellectual institutions which, if they are to be effective and valued, must understand and respond to the changes within the

larger communities in which they exist. Changes in higher education today are evident in three critical areas: (1) the habits and learning behaviors of today's university students (referred to as "Generation Y," "Net Gen," and "Millennials"); (2) the shifts in emphasis from faculty-centered teaching to student-centered/active learning; and (3) the growing accountability movement in public and higher education institutions.

Millennials expect 24/7 & convenient access to information databases & other resources but also to word processing, spreadsheets, audio/visual streaming & editing tools and the like.

The characteristics of Millennials' have been described by a wealth of researchers. They are connected, oriented to working in teams, "multi-taskers," visual, experiential learners, drawn to social networking, "change ready," and focused on transferable skills. They are drawn to the Internet's interactivity and spend an estimated 23 hours per week using various technologies (Katz, 2006, p.3). They adapt "newer technologies" to increase their levels of inter-connectivity, communication, and socializing. Many Millennials are experienced in online learning; 75 percent use course management systems. They are also accustomed to wireless access, laptops, PDAs, etc. which affect the way they conduct their work and occupy spaces. Ninety-nine percent of undergraduates reported using software to write documents for coursework; 91% to create presentations; and 28% to create or edit video and audio files and create web pages.

Incoming freshmen report facility in new media skills – far more so than seniors – and faculty and graduate students are increasingly employing films and other multimedia as teaching and research "texts." Despite their interest and self-described skills in IT-mediated communication and recreation, undergraduates are still comparatively unskilled in using IT for academic purposes, e.g. spreadsheets and data analysis (Katz, 2006, p.5). To expeditiously complete assignments, they expect round-the-clock access to information databases and other sources, as well as to word processing, spreadsheets, audio and video streaming and editing tools, and the like. Importantly, 65 percent of undergraduates surveyed by the EDUCAUSE Center for Applied Research agreed or strongly agreed that the use of IT in their courses has improved their learning by helping them collaborate more effectively with their fellow students and by facilitating prompt feedback from their instructors. Learning theory has suggested that both peer-to-peer learning and instructor feedback are strongly associated with the achievement of positive outcomes in student learning.

Researchers have also noted that Millennials learn better through discovery than by "being told," are skilled in quickly shifting their attention from task-to-task, respond rapidly to

stimuli, and refuse to pay attention to what doesn't interest them. Today's students want to learn through exploration and are enthusiastic about joining campus learning communities. Educational researchers have observed that the traditionally linear approach to learning, e.g., faculty lecture accompanied by student note taking, is far less common among Millennials than is "bricolage," or the ability to piece together information from multiple sources. This suggests the need to broaden the learning paradigm from the traditional faculty-to-student relationship to a student-to-wider-learning-community model, involving experts from a variety of backgrounds, including libraries, writing centers, educational technology, data centers, career centers, and the like.

Customization is key . . .

Beyond the Academy, the corporate world spends significant resources to understand what motivates and appeals to Millennials. Customization is a key theme. When asked their definitions of technology, Millennials respond they are looking for something that adapts to their needs, not something requiring them to change their habits. While students continue to view expert faculty as a key ingredient for learning success, they identify the second most important support for learning as their professors' ability to customize a class by using available technologies. Just as they demand consumer products and services 24/7, they expect the same of university instructional services.

The potential for the library to serve as a site for out-of-classroom learning or as a learning center is clear here. However, the ways in which libraries have traditionally been organized to offer their services pose significant challenges when considered in light of student expectations.

"Education by inquiry demands collaborative effort."

Boyer Commission Report

We know that Millennials have a thirst for discovery-based learning and are comfortable working in teams; both of these skills will be required of them in tackling 21st century societal problems. The Boyer Commission Report, Reinventing Undergraduate Education, foreshadowed much of today's discussion in higher education regarding the need for fundamental educational reform. The Commission acknowledged that deep learning results not from the transmission of information from faculty to students but from independent discovery carried out by students under the guidance of faculty mentors, noting that *"Education by inquiry demands collaborative effort."* (Boyer Commission, 1998, p. 16)

The Boyer Report underscored a dual role for faculty: first, to help students frame meaningful research questions and second, *to provide them with the necessary tools* to allow

them to explore, analyze and evaluate information and create scholarly oral and written products. These tools might well include campus buildings and advising services planned to facilitate both student learning and IT enhanced instruction.

The AACU urges universities to support reforms in the curriculum by the strategic employment of campus resources that can mutually reinforce one another & more effectively support a student body of empowered and responsible learners.

Many of the themes first sounded in the Boyer Report are receiving continued attention into the 21st century. In 2002, the American Association of Colleges and Universities (AACU) recommended that a curriculum for the future be enacted in America's colleges and universities that emphasizes student-enacted exploration of ideas and values and that supports the development of practical knowledge and skills as part of the university educational experience. The AACU urges universities to support reforms in the curriculum by the strategic employment of campus resources *"to support faculty members as they assume the responsibilities for learner-centered education"* (American Association of Colleges and Universities, 2002, p.49) and suggests that curricular and co-curricular programs (general education courses, the library, first year experience programs, etc.) can mutually reinforce each other to support a student body of empowered and responsible learners.

There is an increasingly visible and vocal accountability movement both within and outside of higher education. The AACU suggests that universities can better demonstrate both their value to society and the extent to which their students leave possessing practical, analytical, and intellectual skills and evaluative judgment by setting standards for the acquisition of skills and knowledge necessary to solve today's complex and interdisciplinary problems. The AACU and State Higher Education Executive Officers (SHEEO) recommend the same course of action: set explicit goals and expectations for student learning across the curriculum, design purposeful learning pathways – which could include the re-conceptualization of supportive learning services and venues – that incorporate both general education and disciplinary studies, and align assessment efforts to measure student progress toward the achievement of learning goals.

In his paper, "An Emerging View of Accountability in American Higher Education," David E. Leveille, a visiting scholar at UC Berkeley's Center for Studies in Higher Education writes that the key 21st century higher education performance indicators must include: personal attention from faculty/mentors, access to a global information network and unlimited library collections, a flexible curriculum, personalized learning systems, and lifelong learning support. Kenneth Smith, Distinguished Service

Professor at the University of Arizona, has noted that for libraries to prosper in the 21st century, they must better understand the pressures and changing expectations faced by universities and develop approaches that place themselves in the center of their universities' solutions to these challenges. He further observes that libraries have traditionally focused on making greater and greater amounts of information accessible, rather than on how they can influence and address the achievement of student learning that is critical to student and institutional success.

The transformed library provides inquiry-based learning environments and activities in collaboration with other academic units.

In considering the library's role in supporting the achievement of university articulated student learning goals, Joseph M. Brewer described the "transformed library' as one that "*provides … for inquiry-based learning and out-of-classroom activities" and "develops new and innovative learning environments and activities in collaboration with other academic units*." (Brewer, 2004) The principles underpinning the "transformed library" include:

- the responsibilities for instruction in information skills and research is shared by the entire campus;
- the library collaboratively creates learning environments which allow faculty to teach in new and more discovery-based ways; and
- librarians must spend more time partnering with other campus academic personnel to develop curricula and student assignments and library spaces that support discovery-based learning.

In this way, the "transformed library" becomes a key component of faculty success as they address the many challenges brought about by the learning styles of Millennials, the findings and recommendations of key national higher education reports, and the growing accountability movement in 21st century higher education.

Institutional Context

HIGHLIGHTS

- The Strategic Academic Plan recognizes research-based learning as a distinctive feature of UCB's undergraduate education.
- Berkeley lacks interactive spaces & vibrant hubs for campus life, learning & collaboration.
- The Library has been a key collaborative partner in enhancing the campus infrastructure for teaching & learning.
- The Strategic Academic Plan identifies Moffitt as crucial site for building the interactive campus & creating demonstration projects for collaborative learning.

Historically, UC Berkeley's reputation for academic excellence has rested on its research and graduate program pre-eminence. As with its peer institutions (Boyer Commission Report, 1998), indicators of excellence in these areas have tended to overshadow those in undergraduate education and teaching.

Berkeley is also characterized by a strong faculty governance structure. While the Academic Senate Budget Committee oversees the campus's high standards of academic excellence, the faculty's entrepreneurial energy and excellence has produced a highly decentralized campus culture that affects many aspects of campus life from governance and decision-making to hiring, curriculum, and services. Academic units (colleges, departments, and professional schools) operate with a high degree of autonomy. An important advantage of this autonomous faculty culture is that it recognizes and responds to the unique contexts of the various academic disciplines. The downside of such a culture is the tendency toward organizational "silos" (Educational Effectiveness Report, 2003).

"A vital intellectual community can only thrive when the entire scope of the academic enterprise is located in close proximity . . . to foster the formal and informal interactions that lead to productive collaboration."

UC Berkeley Strategic Academic Plan

This decentralized campus culture is reflected in our teaching and learning spaces. Berkeley is noticeably lacking in interactive spaces that serve as vibrant central hubs for campus life, learning, and collaboration, yet the importance of such spaces has been recognized in several recent reports. The Strategic Academic Plan (2002) identified "contiguity" as a core campus value, noting that "*a vital intellectual community can only thrive when the entire scope of the academic enterprise is located in close proximity, in order to foster the formal and informal interactions that lead to productive collaboration.*"

The plan included a set of proposals for "Building the Interactive Campus," which are intended to foster dynamic intellectual community and interaction. In 2005, the campus hired IDEO, an external consultant, to investigate *"the nature of 'community' on campus and the ways a new student/community center would improve the academic and social experience for students and for all others who spend time on the campus."* In response to the distributed nature of the campus, the IDEO Report argued for the value of satellite community centers anchored by hubs that offer major services and programs. It also argued for the importance of a central hub that would complement rather than duplicate what is offered at the satellites and would anchor the Berkeley campus.

Library Teaching & Learning Spaces Task Force Final Report

Instructors will collaborate with librarians, IT specialists and other campus partners in the delivery of instruction . . . students will seek interactive spaces in which to socialize and learn.

In recent years, Berkeley, like its peer institutions nationally, has placed increased emphasis on undergraduate teaching and learning. In 2001, former Chancellor Robert M. Berdahl created the first ever senior administrative position charged with campus-wide oversight for undergraduate education, the Vice Provost for Undergraduate Education. The establishment of this new position prominently signaled the new campus commitment to make undergraduate education a priority and to place it on a more equal footing with research and graduate education. For the first time, a dedicated advocate for undergraduate education had a seat on the Chancellor's Cabinet.

Citing the Boyer Report, the Strategic Academic Plan devoted significant attention to undergraduate education, acknowledging research-based learning as a distinctive feature of the Berkeley undergraduate experience. The creation of the new Vice Provost position converged fortuitously with the campus's ten-year WASC accreditation cycle. The new Vice Provost was asked to chair the campus' accreditation effort and to make undergraduate education the focus of the campus self-study. The Educational Effectiveness Report included a set of recommendations in key areas, including:

- enhancing the culture of teaching,
- reinventing large enrollment courses, and
- preparing students for successful capstone experiences.

The IT Strategic Plan (2004) also identified teaching and learning as a critical issue for the campus.

Mirroring the national trends described earlier in this report, the 2006 University of California Undergraduate Experience Survey (UCUES) yielded the following picture of Berkeley students:

- 75% of undergraduates own a laptop while only 38% own a desktop computer; 53% bring their laptops to class as least some of the time;
- 87% of undergraduates own a cell phone while only 37% use a land line;
- 86% access the internet several times a day or more, and 45% use Facebook at least once or twice a day;
- 61% use a portable digital music player;
- 73% would like a greater number of classes podcasted or webcasted for anytime, anywhere (re)viewing.

At the same time, physical spaces for interaction are equally important to Berkeley's wired and mobile students. According to findings from a series of focus groups with students and instructors conducted by the Office of the Vice Provost for Undergraduate Education, both students and instructors want more blended learning environments, where technology supplements rather than replaces face-to-face interaction. Students lament the absence of places to "plug in" while on campus—both literally to recharge their ubiquitous electronic devices and figuratively to congregate and interact with other students (VPUE Office 2006).

The library's leadership is evident in the establishment of both the Library Prize for Undergraduate Research & the Mellon Library/Faculty Fellowship for Undergraduate Research.

The Library has been an important campus partner in renewing the campus' emphasis on teaching and learning over the last several years. Its leadership is evident in the establishment of both the Library Prize for Undergraduate Research and the Mellon Library/Faculty Fellowship for Undergraduate Research. The Mellon Initiative, in particular, is an example of a Library-initiated partnership that has been instrumental in implementing many of the objectives outlined in both the Strategic Academic Plan and the Educational Effectiveness Report.

To date, the Mellon Fellowship has been awarded to 45 faculty from the sciences, social sciences and humanities, who have re-conceptualized course assignments and teaching methods with the goals of assisting students in developing their own research skills and improving student learning. More than 8000 students have been touched by the initiative. These developments have institutionalized The Library as a key collaborative partner in the delivery of undergraduate education and the enhancement of the campus infrastructure for teaching and learning.

The Library will play an even more important role in the future as the campus moves to implement its vision for undergraduate education. The Library's role in linking information and instruction will be further enhanced, as research and teaching continue to be viewed as mutually enhancing rather than competing elements of the campus enterprise and as teaching and learning become increasingly interactive. Instructors will collaborate with librarians, IT specialists, and other campus partners in the delivery of instruction, and students will seek interactive spaces in which to socialize and learn.

As previously noted, we know that Berkeley's students and instructors want more blended learning environments. In this emerging learning landscape, dubbed "The Interaction Age" (Milne 2007), Moffitt Library in particular has

Berkeley's students & instructors want more blended learning environments.

tremendous potential to serve as a dynamic, centrally located, 24/7 intellectual commons. It has been identified as a crucial site for "building the interactive campus" and creating "demonstration projects for collaborative learning" (Strategic Academic Plan 2002) and as a potential "satellite hub" for creating community on the Berkeley campus (IDEO 2005).

Moffitt Library lends itself well to the creation of the five elements IDEO identified as important to a satellite hub:

- information,
- replenishment,
- cram time,
- docking, and
- excitement.

The time is ripe to re-envision Moffitt Library as a premier learning space of the future and a campus showcase for teaching and learning innovation.

Many features combine to make it an ideal demonstration project, including its:

- strategic, highly visible location on the central campus footprint;
- proximity to areas where undergraduates already spend time;
- symbolic potential to highlight research as a signature aspect of a Berkeley undergraduate education;
- potential to create "laboratory" environments, especially for students in "non-laboratory" fields; and
- proven successful record of collaborative partnerships with instructors and academic partners campuswide to support teaching and learning.

For all of these reasons, the time is ripe to re-envision Moffitt Library as a premier learning space of the future and a campus showcase for teaching and learning innovation.

Learning Principles & Learning Activities

Learning comes first.

HIGHLIGHTS

- With the shift to learner-centered approaches, the design of learning spaces must consider that people learn in a variety of ways.
- What happens in learning spaces and activities that focus on the learner must inform learning space design.

Data suggests that a majority of learning activities occurs outside of the classroom and that social interaction is a growing part of learning. Today's students are comfortable

"At every chance, the design team tied learning goals and practices into the design of the spaces themselves."

Dan Gilbert
Wallenberg Hall
Stanford University

Learners need spaces to work alone or together, both formally and informally, as they review each other's work, give and receive coaching and assessment, engage in collaborative writing and discussion, form study groups, and ultimately teach each other.

with overlapping discussions and parallel activities that cross over different devices, media, and communities.

While designing teaching and learning spaces, many institutions develop a set of learning principles to guide their work. In the design and implementation process, the set of principles can become benchmarks for measuring progress, making decisions, and assessing outcomes. After the learning principles have been identified, learning activities that support the principles should be specified (Johnson & Lomas, 2005). The following is a summary of common themes related to the development of learning principles and activities.

Learning principles should focus on the learner. Historically, classroom spaces were designed with teaching in mind as well as the accommodation of as many students as possible within the built space. The focus is now shifting to the learner and learning and with that shift some institutions are considering the role of pedagogy while planning for new space use (Oblinger, 2006). The team working on Stanford's Wallenberg Hall redevelopment relied on the principle that learning comes first. *"At every chance, the design team tied learning goals and practices into the design of the spaces themselves."* (Gilbert, 2006, p. 36.5).

Learning principles take into account how people learn. Many students come to class with preconceptions that if not addressed will likely impact further learning. Within their field, students need a deep foundation of fact-based knowledge that is placed within a conceptual framework and organized to facilitate retrieval and application. Teaching metacognitive skills to students (i.e., the ability to explain concepts to oneself to strengthen one's understanding, to rely on background knowledge, and to reflect on, evaluate and control one's learning) can help students to learn better. Being aware of how students' learn best should inform the design of spaces.

Learning objectives can serve as a framework for developing a set of learning principles. The Association of American Colleges and Universities (AACU, 2004) has identified a framework for accountability that could serve as a foundation for a set of learning principles. AACU described five outcomes of a liberal education:

- strong analytical, communication, quantitative, and information skills;
- deep understanding of and hands-on experience with the inquiry practices of disciplines that explore the

natural, social, and cultural realms;
- intercultural knowledge and collaborative problem-solving skills;
- a proactive sense of responsibility for individual, civic, and social choices; and
- habits of mind that foster integrative thinking and the ability to transfer skills and knowledge from one setting to another.

Learning activities are the practical manifestations of learning principles and help to envision a new learning landscape. When thinking about what might happen in new learning spaces, or what faculty and students might do, inquiry-based and problem-based learning activities, synchronous and asynchronous learning, and being able to easily connect to the outside environment and other experts need to be considered.

Moffitt Library lends itself well to the creation of the five elements that IDEO identified as important to a campus "hub" -

Information Replenishment "Cram time" Docking Excitement

Students and faculty require places to acquire knowledge through a mix of reading, listening, and watching. Students not only consume information but should be able to construct new information in a supported environment that allows them to create, edit, demonstrate, and present evidence of their learning. They need spaces to work alone or together, both formally and informally, as they review each other's work, give and receive coaching and assessment, engage in collaborative writing and discussion, form study groups, and ultimately teach each other.

Long and Ehrmann (2005) describe a space where faculty help students deal with difficult ideas and prepare for work they will do outside the classroom.

To facilitate these activities, students need to be able to:

- hear what the faculty member and other students say;
- see what other people show, even if objects are small and many students are in the course;
- capture and replay material, sometimes instantaneously;
- try something someone suggests then and there;
- work for short times in small groups, observing and critiquing one another's work;
- make public presentations; and
- respond to questions, from their peers or the instructor.

The lecturer needs to be able to display student response patterns and use them to prompt further discussion. (Long &

Ehrmann, 2005, p. 50)

Design Principles

HIGHLIGHTS

- Learning spaces should be information rich, promote active engagement, support a diversity of learning styles and ways of working, and remain flexible in the face of changing needs.
- Berkeley must consider the redesign of library spaces to support interactive, research-based learning and learner-centered teaching.
- It is critical that a plan for ongoing maintenance and budgetary support for new and replacement equipment and technology be implemented.

Designs should provide flow amidst a variety of areas, floors, interiors versus exteriors.

Design principles are defined as broad concepts applied on a large scale and used to affect the environment of space and structure. Viewing the design process through a framework composed of principles, guidelines, and standards is helpful in understanding the relationship of individual design decisions to the design entire process. Documented design principles and space requirements are tools that can be used to adapt library spaces to new purposes while retaining important historic features or unique elements.

"Research indicates that the effects of space planning on interactive work are critical for work process outcomes." (Toker, 2006) A learning space should motivate and promote activity, offer comfort, support collaborative and formal practices and a diversity of learning styles, be information rich, provide seamless and reliable support of technology, offer a personal and inclusive environment and yet remain flexible in the face of changing needs. UC Berkeley must consider the redesign of library spaces to support interactive, research-based learning and learner-centered teaching approaches. The following concepts highlight basic design principles and space requirements used in library learning spaces.

Designs should be flexible in order to accommodate evolving technologies and their use. The presence and application of learning technologies, including digital, mobile, and virtual should be a transparent element of the environment.

- Mobile learning is supported with devices that are both wired and wireless, such as computers, personal data assistants, digital imaging, media, and sound equipment.
- Connected learning includes networks that are mobile and large enough to support a range of technologies.
- Supported learning includes "assistive" technologies,

such as voice and eye recognition, accessible ports, audio-visual prompts, plasma screens and digital recording facilities.

- Interactive learning is facilitated by moveable furniture, rolling chairs, tables, and walls, all of which play a significant role in enabling active engagement.

At the same time the library, by its architectural expression and siting, must continue to reflect the unique legacy, traditions and scholarship of the institution.

While spaces must be flexible they must also be welcoming and familiar; design principles allow for personalization of areas and comfort in the space. Environments and resources should be easy to relocate and reconfigure.

EXEMPLAR | The Ryan C. Harris Learning Teaching Center (LTC) at the University of Dayton in Ohio incorporated these design principles into a successful learning space.

The Media Space Project at Harvard's Design School has incorporated new technologies and continues to test their usage in the curriculum.

Designs should be reliable. It is important that on-going maintenance and continuing fiscal support for equipment and technology be integrated into the design principles. "User ownership" — knowing how to use the space, hardware, and software to its maximum potential, with permission to easily change and reconfigure areas for current use — is very important and meets the requirements of Millennials for customization.

EXEMPLAR | The ILC at the University of Arizona conducts annual surveys to determine if current spaces meet users' instructional needs. This allows facility managers to re-direct resources to maintain and update the infrastructure.

Designs should be creative and bold. Designed spaces should accommodate visual and active learning needs through changing focal points — e.g., up close and distance viewing, small and large areas, plasma screens and whiteboards — that create variation in perception and the style of information delivery. To energize and inspire learners and instructors, the use of stimulating multi-sensory cues — visual, tactile, auditory, and kinesthetic applications which influence the intake of information and memory — is recommended. Variety can be incorporated

into color and shape to reinforce association and retention. Connections to nature can stimulate the environment using reflective surfaces, glass and water elements, varying ceiling heights, and diverse shapes.

EXEMPLARS | Designers for Cox Hall at Emory University used soft furniture such as chairs, couches.

The Auburn Career Center includes glass walls to open vistas through the rooms and the ceiling changes color to mimic the sky.

Hallways could become pathways to support learning opportunities with impromptu student gatherings.

Elements of surprise, unexpected spaces, and hidden areas for quiet work should be part of the overall design.

EXAMPLAR | Rhode Island School of Design's new Fleet Library has been installed in a Beaux-Arts bank building in downtown Providence, Rhode Island. It features a bleacher-like multi-level island set up in the middle of the primary reading room, as a "gathering spot" for group events.

Hallways could become pathways to support learning opportunities with impromptu student gatherings. Stairways could become seating.

Stairways could become seating.

EXEMPLARS | The new Googleplex offices in Mountain View, California, include the use of a “main street” or central corridor lined by shared-use building blocks.

The Information Commons at Northwestern University uses a main corridor with round booths connected to presentation stations for small group activity.

The Martin Luther King Jr. Library in San Jose, California combines two types of libraries, public and academic, where the design allows flow between public space, academic environment, and areas for life-long learning.

The ES Corridor Project at Indiana University-Purdue University in Indianapolis focuses on a renovated corridor that provides attractive, comfortable surroundings for people passing through or stopping to use the space. It is close to formal learning spaces and offers areas outside classrooms for students to meet and work. The spaces have also contributed to feelings of pride in the campus and the building of

relationships among students and faculty.

Designs should be healthful. Ergonomics or human engineering dimensions should be applied to the design of systems and spaces in order to provide optimum comfort, reduce stress and injury. Central atriums and terraces allow open views and natural light wells that facilitate interaction between students and faculty.

EXEMPLAR | The design team for Barney-Davis Hall at Denison University made it a priority to reduce the use of toxic substances in and reuse the construction materials of their historic building. The team used products that were Green-sealed Certified, which complied with environmental regulations.

Designs should be sustainable and energy efficient. The incorporation of natural elements contributes to an environment that is healthier, more pleasant, and efficient. Sustainable, renewable materials such as bamboo, cotton, wool, paint, tile, and wood should be used whenever possible. Consideration should be given to the use of natural ventilation, daylight, and rooftop gardens.

EXEMPLAR | The Seattle Public Library was awarded a silver LEED rating; the building includes a sustainable site, water efficiency, energy efficiency, materials recycling and indoor environmental quality.

The West Valley Branch Library in San Jose, California used a Sustainable Design program that incorporates strategies to conserve site impact, water resources, energy, and indoor environmental quality.

Lessons from Model Programs

HIGHLIGHTS

- Start with a prototype learning space.
- Emphasize social interactions and functions.
- Cross functional management works.
- Plan for the "whole of student life," not just studying.

With the coming of the Millennium, several major remodels enabled research universities to experiment with new designs for library learning spaces. This trend has accelerated in recent years, and actual operations of these spaces provide several important insights, which follow

below.

Projects both large and small worked best when a feasible prototype space was first defined and used as a test bed.

Start with a prototype. Projects both large and small worked best when a feasible prototype space was first defined and then used as a test bed. With respect to the Berkeley campus, the most promising zone is the Moffitt Library building. The authors of this report concluded that in regarding Moffitt as a prototype zone, the entirety of the building should be considered as a single unit for innovation.

Space should be pleasing and comfortable. Innovative designs at Duke University, Indiana University/Purdue in downtown Indianapolis and at other sites confirm that students respond favorably to open, airy designs that incorporate a mix of comfortable, modular furniture, with extensive technology options "running in the background."

Clustering student services and staff is powerful. Many learning spaces both large and small emphasize easy access to a multitude of services, including career and writing centers, term paper and reference assistance, IT instruction and technical support, tutoring and media production services, etc. The staff (often student employees) are cross-trained to provide diverse, proactive assistance.

Cross-functional task management works. At Warwick University in the UK, the University Library manages a large group of staff from many departments within its Learning Grid. This suggests that durable agreements between diverse control units can work, if managers are committed.

Evidence suggests that extensive student involvement in the planning and operation of learning spaces is as important as faculty involvement—and should be linked with faculty involvement.

Student Leadership and Involvement is Necessary. Some libraries have created student advisory bodies and even paid internships to ensure that student behavior and preferences are discovered. Evidence suggests that extensive student involvement in the planning and operation of learning spaces is as important as faculty involvement—and should be linked with faculty involvement.

Explore new ways to engage the faculty. It is crucial to involve the faculty in learning spaces at every level, as is the case with students. However, this is a new role for the faculty, and successfully engaging them will depend upon meaningful incentives for involvement. One approach that has worked successfully elsewhere is to offer instruction in and preferential use of experimental or "incubator" classrooms to faculty interested in incorporating new learning spaces and technologies into their courses. Faculty engagement may be topic for discussion that will be of interest to several committees of the Academic Senate.

Plan holistically for student life, not just studying. Librarians and faculty tend to think first of "work" and "study" in planning facilities, but evidence shows that learning spaces that incorporate recreation (e.g., online gaming, socializing) along with task software (word processing, spreadsheets, etc) are much more appealing to students.

Collaborative partnerships: On campus and beyond. Learning space planners should also consider involving the professional community. For example, at Indiana and Purdue Universities' downtown Indianapolis campus, the library invited design firms to design new learning commons "suites"—as a competition. This brought in-kind contributions to the project, suggesting potential for fundraising.

Both high cost ($100M) and low cost ($2M) redesigns can yield important results. Duke and other major universities have created high-ticket learning spaces with very positive results. However, smaller projects also can work. Warwick University located its Learning Grid in a relatively new building, not the older library building, and this enabled the design team to create a new central atrium and staircase at a lower cost, vastly improving the quality of the site. The price tag was two million dollars, yet the impact of the redesign was sweeping.

Budget for initial design and also for evolving needs. In addition to building renovations and initial technology purchases, learning spaces need ongoing fiscal attention and steady budgets, or else they run the risk of becoming obsolete. Therefore it is important for the University Library to plan for technology, furniture and equipment replacement within the learning space, and it makes sense that it should involve other key campus technology programs.

Organizational Infrastructure

HIGHLIGHTS

- Obtain cross campus commitments first.
- Form the Moffitt Teaching and Learning Group as overseers.
- Emphasize student involvement.

This recent history of experimentation suggests that a new moment has arrived for conceptualizing organizational relationships. As technology converges, classroom teaching,

library research and Web use evolve, and new synergies become apparent. But the new synergies run headlong into organizational boundaries. While every institution is unique and has its own challenges, some relatively straightforward initial steps hold promise for Berkeley's Learning Spaces planning process.

Obtain early and strong commitments from all stakeholders. Learning spaces thrive on cross-functionally trained staff that hail from various programs and departments. It is crucial that all control units involved in a learning space prototype make a long-term commitment to collaborative planning from the earliest outset.

Establish a cross-campus Moffitt Teaching and Learning Planning and Implementation Group. The group would give representation to all stakeholders with an interest in the new leaning space, and guide the formation of a viable organizational structure.

Technology oversight requires special attention. A learning space with cross-functional staff will require not only effective organizational leadership, but also a new level of attention to technology oversight. Therefore the planning group should establish a working group that is charged with monitoring technology use, the technology marketplace, emerging innovations, and general wear-and-tear within the learning space.

This working group should possess the influence to make recommendations that can be met with prompt turnaround horizons. This new service challenge will very likely require the University Library to evaluate its overall technology management services, in order to find synergies between traditional technical support (such as supporting library catalogs) and new needs that flow from the heavy use of interactive services within the learning space.

Students must have direct and ubiquitous involvement in the development and oversight of the learning space.

This may call for paid internships and even the opportunity to earn credit.

Emphasize student involvement. Students must have direct and ubiquitous involvement in the development and oversight of the learning space. This may call for paid internships and even the opportunity to earn credit.

Develop a culture of "Asking the right questions." The question we need to ask is, "What do students want to do and why?" Answering that question necessarily brings students into the center continuous organizational change, and enables them to drive the organization as peers rather than as "customers" or "consumers."

Ongoing Evaluation

HIGHLIGHTS

- Evaluation should be ongoing and built into the organization.
- Evaluate both the organization, the building facilities, and the technologies in use.
- Expand the use of structured observations and focus groups to gauge student reactions.

Given that the organization of learning spaces may change rapidly, ongoing evaluation should be built into the management structure as a full time task. Overseers should build in the capacity to discover and evaluate new trends, and quickly launch initiatives that respond to them.

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Many campus units have already committed themselves to continuous planning, and they currently evaluate their activities on a regular basis. Therefore the leap to a more comprehensive evaluation strategy is not great. Elements of ongoing evaluation strategies could include some or all of the following ideas:

- A sub-group of Learning Space staff whose sole responsibility it is to evaluate the use of the space, e.g., performing "walk-throughs" and note taking throughout the day;
- Ongoing assessment of organizational design and management effectiveness;
- Ongoing evaluation of technology—what is being used, what is being ignored, what breaks down, etc.;
- Continuous evaluation of student impressions of the learning space, using on-site interviews and casual discussions with refreshments provided;
- Focus groups to test new concepts against user populations who already use the Learning Space—enabling rapid launches of new ideas and functionalities;
- Regularly scheduled evaluations of how the Learning Space impacts other campus activities, e.g., classroom teaching.

Recommendations

Recommendation 1 | Designate Moffitt Library as an initial campus demonstration project for creating a dynamic and collaborative intellectual commons and innovative campus center for teaching and learning. Designate particular areas within Moffitt as sites of experimentation for state-of-the-art technological and design innovations.

1.1 Allocate all five floors of Moffitt as a campus center of teaching and learning.

1.2 Preference initiatives, activities and services located within Moffitt Library that promote cross-campus collaborations in support of teaching and learning, with particular emphasis on research-based learning.

1.3 Showcase the products of students' research-based learning within Moffitt.

1.4 Share lessons learned through the Moffitt space planning and experimentation with the campus at large.

1.4.1 Develop specifications and standards for needed resources of all kind (furniture, technology, equipment, space layouts and adjacencies, etc.) that support teaching and learning and make them available to all campus units that design and build teaching and learning spaces. The more standardized resources can become, the easier and more cost effective acquisition, maintenance and troubleshooting will become later on.

1.5 Adopt successful Moffitt implementations in as many campus locations as is practicable.

Recommendation 2 | Appoint a cross-campus Moffitt Library Planning and Revitalization Committee composed of campus faculty, students, librarians and representatives from appropriate academic support units.

2.1 The guiding ideal upon which the Committee's work should be founded is the reorientation of the campus from the tradition of decentralized, unit-based teaching and learning support services to a more blended, ubiquitous teaching and learning model.

2.2 The committee should:

2.2.1 Be charged with exploring viable approaches to eliminating the barriers

that stand in the way of easy, convenient, and seamless access to campus teaching and learning support services and activities.

2.2.2 Review the exemplar learning principles and activities outlined in this report, amplifying and revising them as necessary. The revised and endorsed set of learning principles and activities should inform the design of all future campus learning spaces.

2.2.3 Consider and recommend new approaches to funding cross-campus, integrated teaching and learning service initiatives that allows the campus to budget not only for initial design but also for evolving and ongoing needs.

2.2.4 Involve faculty and students to the fullest extent possible in the design of campus teaching and learning spaces. This may involve committees of the Academic Senate and the establishment of student advisory bodies or internships to insure that student behaviors and preferences are discovered and supported.

2.2.5 Build on existing data and trends and recommend approaches for collecting and analyzing needs data to insure that planners are informed about what Berkeley faculty and students want and need.

2.2.6 Undertake a study of the use of highly- and cross-trained student employees to provide reliable, diverse and proactive peer-to-peer assistance 24/7.

Recommendation 3 | Secure formalized and long-term commitments from appropriate campus stakeholders and control units to collaboratively plan and implement blended learning spaces within Moffitt that support of student-centered teaching and research-based learning.

Recommendation 4 | Collaborate closely with campus

technology and IT units to integrate campus teaching and learning support services to the fullest extent possible, locate them conveniently and prominently, provide for their maximum customization, and offer them 24/7 wherever possible.

4.1 The Library should work closely with Education Technology Services (ETS) and Information Services and Technology (IS & T) to build a predictable, reliable, and state-of-the-art teaching and learning support network.

4.2 The Library and IS & T should co-develop a common desktop environment for all student workstations, regardless of location.

4.3 All Library workstations should provide word processing, spreadsheet, statistical, etc. software in addition to library internet, information, and data access allowing students and faculty to work more efficiently.

4.4 The Library should plan with IS & T to cooperatively develop a single printing system for use in all types of campus learning spaces. Printing services should not be dependent on where students are on the campus.

Recommendation 5 | Provide professional development to staff to enable them to re-conceptualize libraries as proactive teaching and learning centers that are integrated with other campus learning systems and services.

5.1 Consider the balance of positions within the Library to insure that adequate resources are being devoted to transitioning the Library to this new program emphasis.

5.2 Evaluate the Library's overall technology management services to find synergies between traditional technical support (e.g. supporting library catalogs) and new needs that flow from the heavy use of interactive services within learning spaces.

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