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LEARNING SPACES: INVOLVING FACULTY TO IMPROVE PEDAGOGY

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New—and newly renovated—classroom buildings, libraries, and computing labs can become highlights of campus tours for prospective students. The freshly painted interiors, the new furniture and lighting, and above all, the availability of wireless networking, up-to-date hardware and projection equipment, and other technology send a message that the campus is modern and in synch with the needs of incoming students. Classrooms boast smart podiums, giving instructors access to presentation technologies and the Internet; libraries offer computer workstations and laptop loans for use in group-study rooms; and labs feature multimedia production facilities. Touring these facilities, prospective students may imagine a curriculum in which the use of technology is seamlessly integrated into teaching and learning. This is key because, according to at least one report, students say that technology is an "important" or "very important" factor in their choice of which college or university to attend.¹ But will these buildings, and the technologies they hold, deliver on the promise of enhancing the teaching and learning program of the college or university? Although a significant investment in the construction and renovation of physical facilities and in the installation of networking capability, hardware, and software may improve students' overall *satisfaction* with facilities, it is not clear that this investment will lead to changes in pedagogy or student learning.

Realizing the Potential of New Learning Spaces

In every type of higher education institution in the United States, renovations of existing learning spaces are taking place or new construction projects are under way: updating classrooms, libraries, and computer labs in buildings that date to the 1960s or even the 1900s; constructing new classrooms, offices, and labs; renovating and adding on to library buildings, often including information or learning commons. In addition to the need for fresh paint, flooring, lighting, and HVAC systems, a key driver in space renovation or new construction is the need to accommodate new technologies, including wireless access, connections to the campus network, and provisions for updated hardware for faculty and students. However, the role of these technologies in teaching and learning, as contrasted with their role in faculty members' research or students' social lives, is often not clearly articulated in the renovation or construction plans.

A number of underlying assumptions may prompt the way in which technology is integrated into learning spaces and the physical layout of those spaces: assumptions about what classrooms should look like, based either on existing models or on ideas of what changes are needed; assumptions about faculty's readiness to change their tried-and-true methods of teaching and how they might do so if technologies are more readily available in the classroom; and assumptions about what role technology has in the improvement of learning. Some key institutional players may see classroom facilities projects as opportunities to institute reforms in teaching and learning, based on the findings of many studies and reports that advocate pedagogies emphasizing such elements as active and social learning (in contrast to the traditional, passive lecture approach). But such expectations may not be clearly articulated to—and indeed may not be shared by—faculty, who have the main responsibility for teaching. The result is often a gap between what is perceived (by planners, administrators, and others) to be the value of the renovation or the new learning space and what actually results. If a costly renovation of a classroom building and the installation of smart podiums and projection equipment results merely in faculty using PowerPoint presentations rather than overhead projector slides in their lectures, administrators might well question whether there will be a healthy return on investment.

Before a project begins, administrators need to ask: Who in the institution has clearly thought out and articulated what should result from the renovation or new construction of the learning space, and does that person or group have the ability to deliver anticipated changes? Typically, the planning process for a major renovation or new construction project will involve individuals from many campus sectors: academic administration, campus planning, building and grounds, physical plant, IT, and faculty groups. As these planners work with the architects and designers, they will be asked questions about the programming of the space; in this phase of the design process, they will articulate the uses intended for the space and provide insight into their priorities for the space. The nature of this process, the stakeholders involved, and the extensiveness of analysis during this phase will vary from campus to campus.² Unfortunately, if this phase is not extensive enough and does not meaningfully involve faculty, facilities may simply be updated in their current configuration—for example, a certain number of lecture amphitheaters, medium-sized classrooms, and small seminar rooms—or new buildings may merely replicate traditional classroom spaces elsewhere on campus. The main results will be a refreshing of the environment and the development of a technology infrastructure (new wiring, wireless access, addition of many power outlets), with no allowance for significant pedagogical changes that could have a major impact on student learning.

Tapping into Faculty Motivation and Interest

Occasionally, a subgroup of planners or a parallel group will work on an overall review of the curriculum, addressing faculty members' pedagogical style and preference and their use of technology in teaching and learning, in preparation for changes in the learning space. Those campuses that do engage in this type of curriculum review in conjunction with space planning have the opportunity to achieve significant pedagogical changes. For example, at MIT, faculty have played a strong role in the design of new facilities, guided by a Conceive, Design, Implement, Operate (CDIO) process. In this process, learning principles are identified and the types of learning activities that will take place in the space are stipulated before an architect is hired: "The learning needs of the discipline drive the planning process."³

Project Kaleidoscope (PKAL) is an organization that works on undergraduate science, technology, engineering, and mathematics (STEM) education and assists colleges and universities in developing a robust planning process for science buildings and other facilities. The organization has developed a website (<http://www.pkal.org/documents/WhatWorksFacilities.cfm>) with rich resources on facilities planning and engaged learning. The list "What Works: Facilities" states: "Spaces that link insights about how people learn into curricular reform . . . illustrate the inter-relationship between curriculum, spaces, and goals for student learning." The interplay between focused analysis of the curriculum and pedagogical style, and the implications for the way classrooms are set up and equipped, can have major dividends for both students and faculty.

Administrators at Estrella Mountain Community College, working in partnership with Herman Miller Inc. and a local business, saw a classroom renovation project as an opportunity to improve teaching and learning at their institution. Two key factors in their planning process were that the discussion of instructional pedagogy would precede the design and prototyping of the learning spaces and that all sectors, including faculty and students, would have genuine input into the process. "The college held meetings, formed focus groups, and conducted surveys to discuss instructional pedagogy and delivery strategies. From this input emerged consensus for classroom design, media/technology, flexibility, furniture, lighting, electrical access, wireless access and other desired classroom teaching aspects."⁴ Faculty and students also experimented with prototype classrooms. The result was model "studio" classrooms intended to increase student engagement in learning. Estrella is now involved in an ongoing process of feedback, assessment, and development of additional learning spaces.

As noted, a successful process must address faculty motivation for making changes in the curriculum and/or pedagogy. For example, faculty may want to improve content learning because of concerns that too many students are unsuccessful in

introductory-level courses, especially in math and science. Or faculty may want to encourage more advanced development of writing skills or critical thinking skills. At the College of Biological Sciences at the University of Minnesota, Robin Wright teaches an introductory course in a room that has been designed as a "concept laboratory." According to Wright, students bring what they have learned from the textbook and use that knowledge to collaboratively "build new ideas, connections, and applications." Students sit in groups at round tables equipped with three laptops per table; the laptops are connected to a screen so that the classroom is ringed with displays of what the students are developing. The professor can send images of examples of interesting work to all of the tables. Wright makes the rounds of the tables during the class, answering questions and making suggestions. In this type of classroom, instructors can teach not only the disciplinary concepts but also the critical thinking skills that are aligned with the discipline. In a video of the classroom in operation, Wright describes the excitement and enjoyment she feels when working in this environment.⁵ Ideally, this type of motivation to reach students in a new way using technology, coupled with the appropriately configured classroom spaces, will lead to highly desired educational outcomes.

Going beyond the Initial Planning Process

Some may feel that the role of planners, and specifically of those who are planning the technology component of the learning space, is to install a basic infrastructure so that faculty will have the flexibility and the freedom to use technology how they want and also in ways not yet imagined. This approach may work for the "early adopter" faculty or those who are particularly engaged in pedagogy. However, most faculty need to work with others in order to implement changes in pedagogical approach and to learn how to use technology in their classes. According to one survey, faculty stated that their biggest challenge in using technology was "not knowing how to use the technology," in spite of their awareness of and satisfaction with institutionally provided technology training.⁶ Many faculty are overwhelmed by the need to use different equipment in the various classrooms in which they teach and by the challenges of keeping up with Web 2.0 technologies, course management systems, and various software.

Professionals—instructional technologists or academic technology professionals or staff in a center for teaching and learning—need to work with faculty on curriculum and course redesign. Their objective should not be to help faculty figure out how to use technology in courses; rather, their aim is to understand what the faculty member is trying to achieve and to suggest innovative strategies for reaching those learning objectives. It may be that the faculty of a department, perhaps in the sciences, believe that the success rate of students in introductory courses could be improved through a different approach to pedagogy. For example, Virginia Tech configured a new facility, the Math Emporium, to address such a need; the institution not only renovated a facility that incorporated technology but entirely revamped the pedagogy for this portion of the math curriculum, in a team effort of faculty and instructional technologists.⁷

Another useful strategy is for a campus team to develop overall design principles for classroom space. These principles could address pedagogical aims, environmental factors, and desired space configurations for different sizes of classrooms. Dartmouth College put together a team consisting of information technologists, the registrar, and staff from the Center for the Advancement of Learning to develop these principles.⁸

Some colleges and universities have made systematic efforts to understand faculty interests and needs related to teaching, learning, and technology. These initiatives may not be tied directly to learning space planning initiatives, but they can feed into learning space projects when opportunities for facility renovation or new buildings arise. Needs assessments for faculty may include surveys, visits to department or curriculum committee meetings, and interviews. As a result of needs assessments, some instructional technology units and teaching and learning centers have tailored educational programs and curriculum development services for assisting faculty with improving their utilization of technology in teaching and learning.⁹ Doing so may require offering brief workshops on specific technologies, or developing technology-enabled resources for a course, or designing extensive, team-based initiatives to revamp a curriculum. Another key to crafting a holistic approach to learning space design is to include consideration of what ongoing services will be needed to support faculty. These include not only curriculum planning services but also services addressing rudimentary needs—for example, ubiquity and a degree of consistency of equipment in classrooms, ease of use, multimodal communication of the facilities, equipment, software, and services that are available, and ready support when things go wrong during class time.¹⁰

Clearly, if a key goal of building or renovating learning spaces is to achieve a change in pedagogy, planners need to address faculty members' interest and motivation, which may differ from department to department or from individual to individual. Most faculty do not want to invest time in changing their teaching style to use technology merely because it is in fashion, nor do they want to integrate collaborative learning into class time simply because they've heard that students like it. They do want to address perceived problems, such as a high failure rate or weak critical thinking or writing skills, and to take advantage of perceived opportunities, such as increasing student engagement or giving students experience with technologies currently used in the discipline's work. For these reasons, faculty need to be deeply engaged in the planning process for classroom spaces.

Connecting Informal Learning Spaces and Faculty

While it seems only logical to embed faculty in the planning process for renovated or new classroom space, it may not be as clear how or why to involve faculty in the planning process for new construction or renovations of informal learning spaces such as computer labs or library information/learning commons. The fact is that faculty expect college students to spend more time learning (related to their academic subjects) outside the classroom than they do inside the classroom.¹¹ Libraries, for example, have long been viewed as venues for reading and studying, for locating information resources for assignments, and for completing homework. More recently, library information commons or learning commons have provided spaces for collaborative student work and access to technologies, along with support for information and technology services. Computer labs provide the hardware and software that enable students to complete assignments using word processing software, statistical packages, spreadsheets, databases, and the like. Planners, who often have generic ideas of what students might want to accomplish in such spaces, may lack knowledge of students' specific curricular needs. Although faculty may be included on planning committees for these informal learning spaces on campus, their numbers are usually too small to represent all the disciplines whose students might use the spaces.

On the other hand, institutions are increasingly involving students more directly in the planning process or are using anthropological methodologies (e.g., observational techniques) to understand students' behaviors. In addition, some libraries are conducting extensive assessments of faculty members' and graduate students' needs regarding research space and services from the library. But again, less attention is being given to supporting faculty members' needs regarding teaching and learning. For example, libraries may not have a process to identify faculty who are giving assignments in which students might especially benefit from technology-enhanced library spaces and services or faculty who would do so if they were aware of appropriate facilities and support services. For the largest and most heavily used informal learning spaces (e.g., computer labs and libraries), most of the programming (e.g., availability of specific information resources and software, type of workshops offered) is provided by IT and/or library staff based on the staff's general sense of what students need rather than on systematic communication with faculty about their course assignments.

Some institutions may have closer links to specific departments and their curriculum. For example, the Weigle Information Commons at the University of Pennsylvania is a joint endeavor of the Libraries, the College of Arts and Sciences, and the Office of the Provost. The Information Commons staff has developed strong relationships with a number of faculty; the staff work closely with these faculty and their students on assignments for which students need to use various technologies. The combination of the physical facility—which includes spaces for small-group work, hardware and software, and multimedia production—and staff who can provide workshops and services assists faculty in being able to try new types of teaching techniques and make different types of assignments. One faculty member noted, "I am astonished to see how the space and its services are transforming my teaching and my students as they continue to take greater control of the process and production of knowledge. . . . My students are becoming scholars."¹²

The expertise of library and computing staff, who will work with both faculty and students, can free faculty members from needing to be experts on every aspect of technology and from providing direct assistance to their students on the more technical aspects of assignments. For example, David Beard, a faculty member in the writing program at University of Minnesota, teaches writing to engineering and business students and assigns them multimedia projects. He notes that his institution's Multimedia Hub facility "gives students excellent group and individual training. . . . You do not need to drop course content to 'teach the technology' any more than you need to drop course content to teach word processing!"¹³ This informal learning space allows an infusion of technology into the curriculum outside of the classroom and without requiring the faculty member to be an expert in instructing students in the use of technology. A key factor, though, is that faculty are aware of the facility and services offered.

For a University of Southern California "Political Media" course, the professor wanted to change her emphasis from an analysis of print and network television news to a study of new forms of political media communication such as blogs and

websites. She also wanted her students to use the various media themselves: for one of their course assignments, the students were asked to produce a video. The redesign of the course and assignment required a team effort. The professor, who was not a particularly savvy technology user, provided the content perspective and course objectives; the instructional technologist helped redesign the course and provided some training directly to the students; the library staff provided the information commons facility, services, and group meeting and production space, with the space available 24X7 for students to create projects. The IT unit provided some equipment, which the library loaned to students, and librarians provided advice on the intellectual property issues related to the assignment and resulting media production. In this example, the combination of facilities, technologies, and support services enabled a faculty member to incorporate new pedagogies into her course in order to realize some important learning objectives.¹⁴

Some facilities include both classroom space and informal learning spaces where students can complete their assignments and projects. At San Jose State University, the Academic Success Center encompasses a wide variety of formal (classroom) and informal learning spaces. Services, particularly workshops and services for faculty, are an integral part of the operation. The center staff found that faculty needed different types of professional development and support, depending on the faculty member's level of sophistication with technology.¹⁵

IT and library staff can engage in outreach programs to departments and colleges: making visits to departmental meetings, participating in orientations for new faculty and teaching assistants, and producing clear materials (websites, brochures, etc.) that describe their facilities, hardware, software, and services. As information professionals work more closely with faculty, they can start to understand which courses emphasize group projects, which courses may encourage or require students to produce multimedia projects, and which courses require oral presentations—all of which have implications for informal learning spaces. Establishing good communication so that faculty will understand what spaces, technologies, and services are available and how these all might best be used can help maximize the optimal utilization of new or renovated informal learning spaces.

Conclusion

If an institution desires more than a facelift or an iconic new building, it should clearly articulate its learning objectives and then place a high priority on including curriculum redesign in the planning process for new learning spaces. Faculty who are genuinely engaged in pedagogy, along with others who are concerned with the teaching and learning aspects of the space, should play a central, not peripheral, role in planning groups. An institution that is serious about making changes in pedagogy, whether or not those changes include technology, should consider the kinds of motivation that faculty might respond to—from an internal grant program for curriculum redesign, to an increase in instructional technologists or other staff, to more frequent or timely workshops, to more reliable day-to-day support for classroom technologies. In addition, a unit or group should be tasked with assessing what is or is not working in the new learning spaces after they are occupied—and with making recommendations for changes.

All of this necessitates a serious investment of resources. In these difficult economic times, administrators at many institutions will likely want to see demonstrable returns on these investments. They may want some evidence that the investments, particularly in classroom technology, are being employed in the ways the planners anticipated and that the investments are creating some improvements in teaching and learning. Faculty may welcome opportunities to rethink their teaching style and the way in which they achieve their learning objectives if the proper supports are put in place. Ideally, with new or renovated learning spaces, formal and informal, all stakeholders can win: faculty can enhance their teaching, students can improve their learning, and administrators can proudly point to the positive results of their investments in physical facilities, new technologies, and support services.

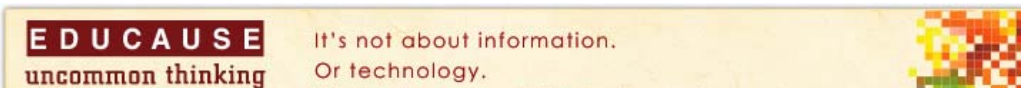
Notes

1. CDW Government, "The 21st-Century Campus: Are We There Yet?" October 2008, <<http://www.cdwg.com/21stcenturycampus>>.
2. For a useful analysis of the design process, see Chris Johnson and Cyprien Lomas, "Design of the Learning Space: Learning and Design Principles," *EDUCAUSE Review*, vol. 40, no. 4 (July/August 2005), pp. 16-28, <<http://connect.educause.edu/Library/EDUCAUSE+Review/DesignoftheLearningSpaceL40557>>.
3. Ibid.
4. Homero Lopez, Roger Yohe, and Lori Gee, "Designing Learning Spaces and Integrating Technology to Promote Student Success," <<http://www.designoflearningspaces.com/AboutUs>>.
5. "College of Biological Sciences, University of Minnesota, Interactive Classroom" (video), <http://www.classroom.umn.edu/Interactive_Classroom225p.mov>. An evaluation of innovative classrooms at the university is also available: "Active Learning Classrooms Pilot Evaluation: Fall 2007 Findings and Recommendations," <http://www.classroom.umn.edu/ALC_Report_Final.pdf>. The college is doing a longitudinal study comparing students who have experienced this type of introductory science course with those who attended traditional lecture classes, to see whether the students in the concept laboratory continue as science majors at a disproportionately high rate.
6. CDW Government, "The 21st Century Campus."
7. "Introduction to the Math Emporium," <<http://www.emporium.vt.edu/emporium/newVisitor/index.html>>.
8. Dartmouth College, "Recommendations for the Design of the Classrooms, Jan. 16, 2007" (seminar handout, "Applying Principles to Initiate and Advance Learning Space Design," NERCAMP Annual Conference, March 19, 2007).
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14. Jude Higdon and Karen Howell, "Comparative Political Media 2.0," presentation, EDUCAUSE Learning Initiative (ELI) Annual Meeting, San Antonio, Texas, January 28, 2008, <<http://blog.lib.umn.edu/higdon/presentations/>>.
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