1.2 Providing Teaching & Learning Spaces

Major Issue: Teaching and learning spaces on campus must be equipped with technologies that support both the diverse teaching strategies used on campus, and the unique learning styles of students in the new millennium. Flagship 2030 and the Facilities Report of the Boulder Campus Master Plan have both laid out physical space expansion goals for the future, including increasing classrooms and large lecture halls, and discussing innovative solutions to large lecture hall needs by using advanced technologies to co-locate learners. These ideas may be insufficient for meeting the needs for smaller and more specialized learning spaces. Meeting these goals will require flexibility in programs and resources to adapt to changes in technologies and teaching needs across the campus.

A. Background/Rationale

CU-Boulder is an outstanding research-intensive and comprehensive teaching university. It should have teaching and learning spaces and technologies that match those of comparable universities. Making appropriate and forward-looking investments in these areas is consistent with two core initiatives in Flagship 2030: (1) enhancing education and scholarship and (2) investing in the tools for success. link:flagship2030/coreinitiatives It also will help with many key flagship initiatives link:flagship2030/flagshipinitiatives, including establishing more residential colleges and programs and offering all students customized and experiential learning programs. The latter initiative in particular can be enhanced with appropriate technologies for learning and distributing knowledge, as well as help distinguish an education on the Boulder campus from the growing availability of distance education. Additionally, the facilities task force report of the emerging Boulder Campus Master Plan calls for further investments in technology in existing classrooms, at least one more very large classroom with technology to transmit lectures to satellite rooms, while the east campus task force report envisions that area to be a full academic campus with teaching and learning rooms (http://www.colorado.edu/masterplan/taskforces/index.html). In making such improvements, planners should be aware of the considerable heterogeneity that exists in needs for spaces of varying sizes and technological capabilities.

We see a four-pronged set of issues for IT planning. First, it is important to continue to upgrade existing spaces to achieve near-universal coverage of Smart (media equipped classroom with at least a screen, digital projector, room controller SP panel, DVD/VHS or other video playback

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<td>Arts &amp; Sciences ASSETT at college level Dean’s office, for advisors ALTEC for language departments Chemistry Communication Ecological and Evolutionary Biology Film Studies Geology Molecular, Cellular, and Developmental Biology Physics</td>
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technology, campus cable TV, sound system. The basic technologies installed evolve over time as the technologies and needs change.) or similar new technologies. This should be done at least in centrally scheduled facilities, though the need extends also to department-controlled spaces. In this regard, currently 136 of 182 centrally scheduled classrooms are Smart, while demand for such facilities grows rapidly. Second, ITS needs to work closely with campus planners and facilities management to ensure that new teaching and learning spaces are appropriately equipped. Third, as new spaces are constructed or existing spaces are renovated, attention should be paid to the heterogeneous teaching and learning needs of faculty and students soon to arrive on campus. Perhaps most significant is the increasing usage by students of IT-equipped commons rooms, such as those in libraries and RAPs, and smaller team rooms. Thus, planning of physical spaces needs to evolve to meet both changing demands for learning environments and emerging philosophies for teaching in groups. Fourth, the existing model for centralized procurement of teaching and research software is not sufficiently flexible to meet the rapidly changing needs of a number of units. A more responsive model in terms of monitoring needs and pricing for access would help support learning, particularly by undergraduate and graduate students undertaking research projects.

B. Accomplishments to Date

ITS has made significant investments in upgrading classrooms to Smart status, though the work is not complete. Technology space demands are increasing at a faster rate than the funding and resources can build them. Campus has made it a priority to fund additions of smart classrooms with temporary funding over the last 2 years. Campus has been adding facilities at a rapid pace, with a need to continue over the next 3 years to reach the goals. With these additions, we have been creating a renewal and replacement burden for the campus that will only be met with continuing funds commitments.

Large lecture hall technology models have been changing and evolving during the capital construction boom on the Boulder campus. There has been more of a focus on providing technology that is easy to use, which can operate without attendant support, and puts the tools in the hands of the instructor. Distance learning has been included as a goal in all program plans, and capabilities have been installed in most of the new construction projects in large halls or classrooms (recent ones include Leeds, ATLAS, Visual Arts). Our model for large lecture halls has evolved to meet the new demands. We need further refinement in physical room design evolution to meet changing demands on space.

All capital construction projects have been planning 100% Smart technology in classrooms they provide. This is a positive trend that helps us meet our goal of equipping more rooms with technology on campus. There are support model and long term campus renewal and replacement considerations to address with this planning.

Space design in teaching and learning computing labs and classrooms is also evolving. Students like big, open spaces to work in groups and alone, with food and ability to interact and take a break. There is still a need for quiet library style spaces as well. Community spaces for interaction are becoming more popular, with new commons style spaces packed with users well into the evening hours. As spaces are renewed on the regular cycle, they are adapting to the newly defined needs. We have installed new commons style arrangements in labs in Norlin Learning Commons, UMC, ALTEC in Hellems, Education, ATLAS, RAPs, Leeds and have more requests pending.
Students find the team rooms (*a small, enclosed technology equipped group work room with at least an LCD panel to project content, a controller, and audio reinforcement*) to be very useful for their work. All of these group study rooms are popular and heavily scheduled. We need more of these on campus.

**Action Plan**

**A. Explicit Assumptions**

"Millennial learners" and other new students will be increasingly familiar with a broad and rapidly changing array of information technologies for engaging in communication, social networking, information searches, and studying and working. Although these students are likely to arrive with laptops and mobile devices, usage patterns to date indicate that some desktop labs need to remain, with a range of technologies available. Faculty and students are likely to expect more than passive access to IT in classrooms and other learning spaces, placing an emphasis on interoperability and capacity within each space. Much of this capacity will operate through wireless means, putting a premium on consistency of signals to avoid work disruptions. Demand is growing for three types of jointly used spaces: commons areas with internet and networking access (and amenities such as food and beverages), team rooms for student collaboration, and small spaces for specific uses, such as audio or video recording, and videoconferencing.

In addressing such demands, flexibility is one key approach: we cannot predict all changes in technology and use patterns. Neither can we satisfy every possible teaching and learning demand for technology in every space, in part because these needs are sometimes in conflict. Governance is another key issue: an inclusive body needs to be charged with setting priorities, continually evaluating needs for space upgrades, and allocating scarce resources. Information is another requirement: faculty should have access to knowledge about best practices at similar universities, by broad discipline.

**Accessibility Issues:** The task force sees no particular issue regarding access for disabled persons other than urging facilities management to ensure such access is provided when rooms are built and renovated. Our Divisional standards documents already specify requirements around ADA accessible podiums and technology within the space.

**Sustainability Issues:** The task force recommends additional investments in Smart (SMT) rooms and a significant increase in the number of electrical convenience outlets in classrooms and commons rooms, which could raise long term electricity demand. Additional video and audio transmission capacity could do the same to both electrical service and network bandwidth/availability.

**Specific Assumptions**

- Support (face to face, online, video, etc) for all recommendations must be considered a priority.
- Ongoing funding for renewal and replacement of recommended space tools and hardware: must consider the long term implications of the implementations when approving campus projects.
- Assumption: a governance body will exist to provide high level prioritization. Should include students, IT, faculty, and administrative governance.
• Assumption is new developments that come out of the recommendations shall, everywhere possible; conform to Section 508 and campus accessibility standards.
• Flagship 2030 vision, along with Facilities Master Planning guidelines should provide the framework for IT space decisions and priorities.
• All faculty and students need access to the best space and technology to facilitate their teaching and learning styles. Best practices should be applied relative to other similar-sized research Universities.
• We cannot fully future-proof our spaces for anything that might come up in the future, nor can we satisfy every possible teaching and learning demand for technology, because they are often in direct conflict with each other.
• Spaces will be continually evaluated and revised, new priorities set by the governance body selected.
• Despite increase in student use/ownership of technology (especially laptops), some desktop labs will continue to be necessary.
• This group is not attempting to reflect the potential needs of Conference Services, an auxiliary unit that will be using some of these spaces. They have not traditionally provided financial support for the rooms they use, and oftentimes they deliver their own set of Audio Visual equipment.

B. Specific Recommendation

• A better governance system should be developed that will help set priorities for allocating resources across needs and among emerging technologies to support teaching and learning. This model should include representation from faculty and students along with technology experts.
• Continue investments to increase the number and percentage of smart classrooms of all sizes, while consulting with faculty members about whether particular rooms may be better served without Smart technology.
• Develop more spaces for collaboration among students, and between students and faculty in technology and information use. Examples include commons rooms, RAP great rooms, and team rooms that offer connectivity and workspace.
• Consider providing ample convenience outlets for all new capital construction, and also undertake a retrofitting analysis in older existing teaching and learning spaces. ITS needs to work closely with facilities management on technology choice and installation in infrastructure renovation projects.
• Due to the increasing proliferation of wireless devices operating on many frequencies and technical specifications, all new campus construction and renovation projects should take account of all wireless technologies that are likely to be present, and should adapt designs as needed to minimize interference within teaching and learning spaces. This must include consideration for wireless/mobile communication to all spaces in the building, including but not limited to radio frequencies commonly used by police/fire/life safety personnel and support staff. Addressing this problem will require extended communication during planning phases of facilities projects.
• There appear to be sharply increasing specialized audio and video needs across campus for individual and team recording of research results and creative work by both students and faculty. The campus needs to provide more small, private, and sound proofed spaces, which could be located in both academic and residential buildings.
• There is considerable variation among departments in their needs for and uses of teaching-oriented computer labs but at this time there is no consensus that such labs can be eliminated in favor of relying on student-provided laptops and devices. This heterogeneity
implies that ITS should coordinate closely with departments regarding their continued needs in this area. Greater availability and access to application software could reduce some space requirements and provide more flexible and dynamic learning spaces.

- The current IT procurement model regarding department-controlled spaces is ad hoc and needs reconsideration. Left to their own devices, the departments with more limited resources cannot invest in the technologies needed to support their teaching and learning mission. A more centralized funding model should help support provisioning of standard and emerging technologies in all classroom spaces, including departmental locations. Campus should promote more shared, multifunctional, cross-departmental environments where space is limited.

- A key function of ITS is to provide software for teaching and learning spaces. The governance body recommended above should actively work with units to understand their evolving needs for centrally purchased software and how it is delivered to student machines, computer labs and department spaces. Some effective approaches would be software Enterprise License Management (ELMs – tools such as e-academy to manage distribution and tracking of institutionally purchased software licenses), and/or keyed, virtual delivery of software and shared licensing on an enterprise level for all of campus to use.

- There is an increased demand for shared centralized server space and a shared computing canvas for teaching and learning, integrated with research. One useful example would be development of virtual spaces for students and faculty to meet and work.

- Central scheduling of classrooms and especially computer teaching labs is sometimes inefficient in terms of class sizes and time allocation. While central scheduling is important to retain flexibility, schedulers and ITS should coordinate better with departments on their needs. A task force should be commissioned with stakeholders to develop an action plan to improve space scheduling. This analysis should take into account the needs of all stakeholders, including Central/Academic scheduling, Non-Academic Scheduling (UMC), departmental facility scheduling, and ITS facility scheduling.

- Determine how spaces can support dynamic learning environments that provide more flexibility and respond to both student driven needs and creative faculty inspired learning environments. Consider implementing more models such as highly interactive virtual environments (HIVEs), peer-to-peer informal learning, clusters, individual work spaces, external work support for off campus, outside, traveling, etc.

C. Long & Short Term Objectives/Timeline

Short term: Organize an appropriate governance model to begin setting priorities and improve coordination with room schedulers and unit heads. This will be an ongoing activity. Survey or otherwise take stock of whether and how units finance technology needs in the spaces they control, along with needs for centrally purchased software. In addition:

- Address "quick win" policy and standards recommendations.
- Continue smart-classroom upgrades.
- Implement requirement for RF wireless interference analysis and additional convenience outlets into new construction standards documents.
  Timeline: AY 2010-11.

Long term: Develop means by which the governance unit can interact more fully with facilities management and the Boulder Campus Planning Commission on technology investments and technical constraints in outfitting teaching and learning spaces in new buildings, RAPs, and common rooms. Investigate the need for small spaces and team rooms
equipped with audio/video technology and work with specialized units (e.g., Film Studies, Music, Art & Art History, and Architecture and Planning) on their requirements.

- Begin conversation around creating funding model for all classrooms
- Create centralized storage/virtual workspace/shared canvas
- Engage scheduling task force to discuss and formulate a plan for better centralized scheduling of all teaching and learning spaces.
  
  Timeline: ongoing from summer 2011.

D. Possible Risk

- Becoming tied into particular technologies that may become quickly outdated, a problem that is best addressed by flexibility in resources and planning and foresight by ITS and governance unit.
- Security issues regarding confidential data and records may accompany greater reliance on centralized software servers. Service cost viability will likely be a dynamic attribute of the service. Perceptions about the value of the service and the ability to adjust to market changes
- Classroom emerging technologies such as classroom capture will have security implications for the storage and publishing of the content.
- Increasing requests for 24/7 spaces to study have an impact on student safety and their need for services such as nightwalk/ride and cameras and phones in rooms.

E. Resource Allocation

The cost of these recommendations is expected to be very high.

Funding for increasing quantities of Smart classrooms, and continued support for renewal and replacement of these rooms is in excess of $500k annually. This funding has been allocated on a temporary basis for the past two years. Continued funding of this service has been a top priority for the campus, so the funding stream is likely to continue.

Cost for supplemental power outlets within buildings is a large number that depends on many factors. This should be considered during program plan phase of construction projects for inclusion in the program plan funding requests. For campus building renovation projects such as Ketchum, this should also be a standard consideration.

Computing labs managed by ITS are funded through student fees ($1.8M), and have a continuing funding source identified. Future planning for efforts such as software delivery to campus and student devices should be considered a component of the student fee budgeting process, with supplemental funds to support staff and faculty use requested as needed from general campus fund. Justification of these initiatives should include an analysis of central campus savings that would occur by not distributing funds to departments, but rather applying common good principles.

Modifying campus standards documentation will have minimal (less than $5k) costs associated for professional services to develop and create the Divisional documents with campus collaboration.
There will be a significant cost associated with creation of a new, shared canvas virtual space for campus to use as a community. This is, in effect, developing a database hosting service, which requires analysis, development and some investment in hardware and software or cloud based services. This cost is expected to be approximately $80k. It is important to note, many ITSP chapters such as developing rich collaboration tools have a similar request, so funding planning should account for the shared nature of this request.

Developing a new funding model for ALL classrooms could have a significant cost. There are approximately 500 (280 are supported by ITS) spaces on campus that are used for instructional purposes (many are not Smart rooms). Properly supporting the technology installations, and funding for renewal and replacement and additional staffing resources could be significant. We would expect a need for increasing staffing levels by 4 FTE to provide central support of these spaces in a common good model, with standard smart technologies installed. The cost for appropriate renewal support of these spaces is significant, in the $300k-450k range if all are made smart. This need will be further developed and funding amounts honed as part of the recommendation to switch to a central funding model.

Central scheduling improvements cost would be in the $30k-50k range, for analysis services and development of new tools or workflow processes.

**F. Responsible Parties**

ITS, Campus-wide Governance Group, Boulder Campus Planning Commission, Facilities Management, Central scheduling, Campus CFO, and all department stakeholders.

**G. Evaluation**

- Statistics of classroom equipment deliveries to spaces that are not Smart should reduce over time as upgrades are completed. This could improve resource utilization for the campus as a whole.
- Academic assessments of usage of technology in spaces. A continual evaluation of the current suite of technologies and its perceived value to the University Teaching and Learning mission.
- Cost savings analyses for providing technologies centrally or in a standards based fashion.