1.3 Offering Teaching & Learning Tools

Major Issue: While the campus needs to focus on delivering and supporting specific teaching and learning tools, the half-life of a list of promising teaching and learning tools is very short. A more lasting and strategic improvement can be made over the next four years, however, by improving processes for identifying, exploring, testing, and communicating about teaching and learning tools to be supported by campus.

A. Background/Rationale

One attribute of the world of teaching and learning tools is the rapid change and growth in the tools available to assist people in teaching and in learning. Another attribute is some support is best provided centrally while other support is best provided locally. The campus needs to consider this, as well as how best to vet teaching and learning tools through a process of selecting, testing, and evaluating tools and services by faculty and students. Many campus constituents are not included in user testing processes currently. Also, communication about support for teaching and learning tools on campus is neither uniformly received nor understood by key constituents across campus. And, there are not enough resources on campus for supporting the use of technologies.

All of this occurs amid a general milieu of concern about safety of data, FERPA considerations, copyright concerns, and concerns about storage of large data or media sets. Given this, our committee thinks there should be a comprehensive campus-level effort to provide guidance to the campus about the best tools for specific jobs, about legal considerations, and prearranged "cloud"-based tools that have been vetted by a university contract.

Our committee identified lists of teaching and learning tools that we think need to be addressed, which can be found below in section B. We identified a process for identifying those technologies, having faculty and students review them and posit uses for them; and a process that includes user testing those technologies before they are widely deployed. Visual collaboration and rich media is a recurring theme in this chapter. This is an emerging areas for growth. In addition, lecture capture tools, classroom capture tools, rich collaboration (Skype, WebEx) with shared whiteboard space, visual access to all media are all important areas to address.

B. Accomplishments to Date

Even though the campus faces declining state funding, teaching and learning technologies have been adopted at a certain level across our campus. For example, nearly every CU Boulder student has at least one class on CULearn, the campus’ learning management system. However, much more thorough and deeper adoption has occurred in pockets across campus. For example in Physics, much work has been done with student response systems (clickers), with online simulations (see http://phet.colorado.edu/index.php), and with lecture capture systems.

Our campus has benefited from the recently completed Flagship 2030 strategic plan, which produced a number of initiatives that the campus should keep in mind as it provides support for teaching and learning tools.
Looking back to the last IT strategic plan, which was created in 2006 we can see that progress toward a number of initiatives related to teaching and learning tools was mixed. For example, very little work has been done on evolving the model of smart classroom support to account for multiple levels of user sophistication with technology and multiple pedagogical approaches. Also, the campus did not establish the Faculty Evaluating Emerging Technologies (or FEET) committee. And little work has been done to foster a culture of innovative and effective uses of technology-enhanced learning spaces.

**Action Plan**

**C. Explicit Assumptions**

Assumptions that we made about teaching and learning tools include that lists of tools are less central to this strategic plan than describing an ecology that is supportive of effective tool adoption. Also we assume the disruptive state of change in tools applied to teaching and learning situations will be able to be addressed. Further we assume that the campus will find it important to invest in the 2030 initiative as well as in tools used in support of teaching and learning over the next four years. We assume the campus will be willing to both invest in centrally supported, widely adopted technologies; as well as locally supported niche technologies. We assume that over the next four years faculty will be recognized for work they do in integrating teaching and learning tools into their curricula. And the campus will evaluate each new educational tool that will be supported. And finally, we assume that the campus should fund accessibility of any video technologies that are adopted. For example captioning of video is required when hard-of-hearing students will be viewing that video.

Assumptions about governance as well as policy and legal implications of teaching and learning tools include that the campus will be able to invest in improved methods of governance, communication, and user testing. Further, we assume that the policy and legal questions of how to respond to an environment where free and powerful tools are available outside of the campus will be addressed.

Assumptions about recommendations from the last strategic plan are that the campus will continue to work on those initiatives outlined in the 2006 planning process that were never implemented fully.

**D. Specific Recommendation**

This committee discussed a wide range of recommendations for improving the support for the tools used in teaching and learning. Overarching themes that emerged from our discussion were that the campus should look at support models from other universities; that technologies should be easy to use and compatible with a variety of other technologies; they should conform to standards; that we should have a “one start shopping” portal for access to technologies; and we should have a single point of help for technologies.

The campus needs to establish a formal system of governance over the support for educational technologies, programs to encourage faculty to test new tools, and a process for testing technologies and services across the board during project phases.
This committee would like to see phase-out dates for each centrally-supported technology, so that technologies that have outlived their usefulness can be retired. We would like to see faculty course questionnaires (FCQs) incorporate some measure of educational technology use. We would also like to see the campus provide incentives for faculty to use educational technologies. More detailed recommendations follow.

**Support Visual Interactivity**
Because the creation, manipulation, and dissemination of video is so central to the direction teaching and learning technologies are developing; and because of the high cost of travel; technologies that employ video are likely to have a large impact on teaching on our campus. The campus should increase support for using video in learning contexts. This includes adding or enhancing services for videoconferencing, web conferencing, streaming media, downloading rich media, media capture in learning spaces (i.e. recording classroom activities, such as lectures), and video as students' scholarly work.

Part of the support for visual interactivity includes increasing existing support for advising faculty members about copyright, especially as it pertains to rich media assets. For example the campus should provide a means for giving faculty members advice on the TEACH act and Fair use. The copyright web site is a start in this direction, but providing a person who can give advice would be even better.

**Support File Storage and Sharing**
Because increased adoption of rich media formats are important for teaching and learning, it is very important that our faculty members and students have a much larger capacity for storing and sharing files. Any plan for a storage service needs to incorporate aggressive growth in capacity every year. This service should also provide for a variety of means of sharing files, including the ability to share files with colleagues outside of CU-Boulder. The goal in providing this service should be to make data storage be as widely used (and as useful) as email.

**Support Widely-Adopted and Discipline-Specific Technologies**
This committee would like to see continued central support for those technologies that are already widely adopted across campus as well as new support for technologies that have been adopted in local pockets. A number of educational technologies, perhaps the majority of them, are adopted by many disciplines. Examples include learning management systems, DVDs, blogs, wikis, etc. And this campus has attempted to provide support for some of these technologies.

More work remains on many fronts, however. For example in rich media dissemination, the campus does not have a solution for streaming media or for rich media downloading. At the time of this report, a service like iTunes U appears to have that capability and is a likely candidate for adoption. So it is important for the campus to continue to work in this area. Also more work remains in the learning management system space. We would like to see support for the Enterprise 2.0 model for a learning management system. This model shifts the learning management system from being a stand-alone monolith to a more open framework that allows the user experience to be much more flexible and to grow organically.

While central support is important, it is just as important for the campus to provide support for technologies that are adopted by only a few disciplines. Some disciplines adopt technologies early that will later be adopted campus-wide. For example clickers were first adopted by Physics faculty, and they spread the word about them. Once enough departments adopt a technology, it may make sense for the campus to provide centralized support of this technology.
Some educational technologies seem to have a niche in particular disciplines and will likely never reach a critical mass for central support. The campus should recognize this and put resources in place to support those more local technologies. Examples include Smart Boards, which seem to be used primarily in Education.

**Improve Communication about Technological Services Available Across Campus**

Many campus services that provide support for tools for teaching and learning are not widely known across campus. This committee would like to see an increased effort by the campus to advertise and market these services. One-time email messages are not sufficient. Nor is a quiet post on a web page about a service. What is needed are increased resources and efforts aimed at multiple channels of communication and multiple audiences. This information should be simple and it should be pushed to faculty and students on a somewhat regular basis. ITS should provide a glossary defining what it means by various terms it uses. For example, what is ITS’ definition of a smart classroom? What is ITS definition of a media capture service? The campus should assemble and widely communicate about a portfolio of supported, recommended, or used teaching and learning tools. This could include a graphical roadmap of educational technology tools and services.

Faculty members should be able to get personal tutoring on a system from resources such as Academic Technology Consultants (formerly DATCs), student assistants (for simpler requests), and possibly a lead-technical faculty member in the department. Although ITS and the Faculty Teaching Excellence Program hold workshops, it is still efficient to reach out to faculty who don't attend them.

The campus should also improve communication about support for accessing libraries resources and it should provide a central service for software licenses so that CU-Boulder can get better licensing rates.

**Improve Processes for Selecting & Testing Technological Services Offered to Campus**

When the campus rolls out technological services, there is not enough rigor around the design, selection, and user-testing of those services (including the technologies themselves at the heart of the services). Services rolled out by ITS should be user-tested more rigorously before being rolled out. This should include reaching out to other campus IT units and academic units for pilot deployments where faculty and students are studied as they use the service. Some effort should be made to establish standards for supported technologies.

The campus should re-commission the Faculty Examining Emerging Technologies (FEET) group called for in the previous strategic plan. Instead of it being a committee, however, we recommend that it be a loose network of faculty who agree to examine a technology and students and faculty who vote for technologies to be examined. The campus needs to provide people and funding to support this group.

The campus should also provide a sandbox space and virtual space for any faculty member to explore technologies they might want to adopt. As part of the agreement for using this space, the faculty member should agree to provide feedback to ITS on their impressions of the usefulness of the technologies.

**Expand and Enhance Existing Support for Faculty Who Want to Use Technologies**
The faculty needs even more resources for one-on-one support for using technologies. This includes more support that the Academic Technology Consultants (formerly DATCs) provide. It also includes faculty-to-faculty and graduate student-to-graduate student mentoring in using technologies. This would imply providing more support to the FTEP and the graduate teacher program (GTP) for mentoring. Also provide support for faculty who want to go deep into learning a technology that is not traditionally supported (i.e. learning a database or programming language).

The campus should investigate the following technologies, which may have an impact on teaching and learning: augmented reality, integrated technology, mobile technologies, virtualization of applications, and three-dimensional video capture and television.

**Continue to Support the Following Technologies**
The committee feels that the following technologies are fruitful for ongoing support: Learning management systems, clickers, email and calendaring systems, web pages for faculty and staff, (including wikis and 'blogs), social networking applications, plagiarism detectors, projectors, labs including allowing classes to teach there, digital projectors, videoconferencing, and virtual private network connectivity to campus services.

**Add Support for the Following Technologies**
The campus should consider adding support for the following technologies over the next four years: streaming media; smart boards; document cameras; campus calendaring system and integration; web conferencing (for example WebEx); secure exam-taking software (for example Exam Soft); classroom lecture capture; web-based conferencing; conferencing systems to support other communities such as universities, non-profits, and businesses; web 2.0-based learning management system; improved search engine for the www.colorado.edu site; increased data storage; security options that would allow outsiders to access campus resources; mobile technologies including compatibility among mobile devices; push technologies; web content management; iTunesU; lock-down software for browser use in class; software for verifying identities and protecting identities; and wireless printing.

**Long & Short Term Objectives/Timeline:**

**Year 1:** Continue to work on the 2006 recommendations from Chapter 1 of the IT Strategic Plan — Timeline: 1 year. Continue to develop (and market) the "one start" shopping model of 5-HELP, web resources, and portal — Timeline: 1 year. Establish a process for phasing out dates for centrally supported technologies — Timeline: 1 year. Improve communication about technological services available to the campus — Timeline: 1 year.

**Year 2:** Improve processes for selecting and user-testing technological services to be offered to the campus — Timeline: 2 years

**Year 3:** Establish criteria for recognizing faculty members' use of educational technologies and implement a program to recognize them — Timeline: 3 years
Expand support for, and services in, visual interactivity, file storage and sharing, widely adopted technologies, and discipline-specific technologies — Timeline: 3 years

**Year 4:** Expand and enhance existing support for faculty members who want to use technologies — Timeline: finished in 4 years.

**Possible Risk**
This committee identified a number of risks inherent in adopting (and not adopting) the recommendations in this chapter. These include funding risks, communication risks, cultural risks, and support risks. Our support risks are divided into analysis risks, and vendor-related risks.

**Funding Risks**
Funding risks include the ability of the campus to implement the suggestions described in this chapter may be negatively impacted if enrollment changes dramatically. If the campus adopts certain teaching and learning tools, there may be hidden costs (open source, service contracts, maintenance fees).

**Communication Risks**
Communication risks include the possibility of messages sent not being received and understood by campus constituents.

**Cultural Risks**
Cultural risks include unanticipated consequences from the adoption of a new teaching and learning tool. For example, adopting a learning management system may lock us into working with an ecology of third party vendors that interface with the primary LMS vendor. For example, once you are invested in the world of Blackboard, their SafeAssign tool makes sense financially, but it may not be the best tool to use. Another cultural risk is a backlash against a teaching and learning tool if it was not vetted appropriately ahead of time. A further risk is that some technologies might be used in ways that could bring harm to users. For example if Excel files are kept on unprotected hard drives, FERPA data may be exposed to people who want to steal that data.

**Analysis Risks**
Analysis risks include that the campus may inadequately assess campus need, and thus "miss the boat" with tools it supports. That is it may pick the wrong tool for the wrong audience or situation. Additionally, the campus may over- or underestimate the need that supported tools are envisioned to meet. Without a careful analysis of tools to be supported, the campus may end up with duplicated tools or redundant tools being supported.

**Vendor-Related Risks**
Vendor-related risks include that the campus may find it attractive to purchase licenses from third party vendors and then find itself not able to be as flexible with the tools provided by that vendor. The campus may settle on one or two vendors and find that those vendors have too much control over our budget outlay or services to the campus. Conversely, the campus may work with too many vendors and find that it's ability to manage relationships with vendors is strained. Vendors may discontinue support or force us on an upgrade path that isn't ideal for the campus. Finally, vendors may change direction in the services they provide, thus leaving us with fewer attractive reasons for working with them.

**Resource Allocation**

Cost of the project: This committee did not feel it had the knowledge of resources that would be needed to implement its recommendations.

**Responsible Parties**
The AVC for IT and CIO should establish a Technology Advisory Group (TAG) that reports to the CIO for the purposes of advising ITS on technology policy, investment, and support. The TAG should be comprised of faculty and staff who have both expertise and interest in using technology. The TAG’s charge should be to provide advice regarding the development and implementation of coherent, efficient policies that support both the innovative uses of technologies as well as effective dissemination and implementation of established technologies. All constituencies on campus are responsible for effective implementation of technologies to support research, teaching, and service mission of this campus. So the AVC for IT office should provide support to assist these constituencies in assessing the effectiveness of their technology support programs.

**Evaluation**

Evaluating the recommendations listed here is very important. A coherent approach to evaluate any technology policies, processes, or tools should consider: (a) the quality and appropriateness of an adopted technology, (b) the quality and impact of its dissemination, and the (c) impact of the technology on outcomes (e.g., student learning, faculty research, work productivity, and/or service/outreach).

We encourage the campus to develop incentives as well as specific measures that promote faculty and departments to evaluate more effectively and systematically the use of technology to support student learning.

The campus should establish a function to evaluate the effectiveness of teaching and learning tools. This should be applied to tools being considered before adoption (see the recommendation from the 2006 ITSP on the Faculty Evaluating Emerging Technologies (FEET) group.

This function should also be applied to tools and services being supported currently. Findings from this function should be shared with the entire campus and should be a major source of input for the IT governance group and the various groups on campus who are involved with faculty development. Just as importantly, findings from this function should be used as input by campus-level program managers in deciding which tools and services will be retired and which ones will be launched.