

Focusing Resources and Fostering Creativity

Joint Functional Sponsors Group – Technical Sponsors Group Report to the Faculty Committee on Educational Technology on the Common Collaboration and Learning Environment

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Executive Summary

In January 2006, the Functional Sponsors Group (FSG) and the Technical Sponsors Group (TSG) were charged to develop a joint recommendation to the Faculty Committee on Educational Technology (FCET) for a common collaboration and learning environment (CCLE) for UCLA. The two groups met separately through mid-May. In late March, the FSG created a working draft report, and over the subsequent weeks, the TSG inserted sections and comments into that draft. At the same time, the FSG refined their working document, presenting a finalized draft to both groups in May in preparation for the joint meetings. The two groups then converged for a series of joint meetings in May and June to agree on the elements of a joint report. The FSG-TSG reached agreement on the following key areas:

1. Research, teaching and learning are at the core of UCLA's mission. Therefore, the CCLE must serve to promote innovative and effective research, teaching and learning in every way possible.
2. UCLA must financially and culturally support the CCLE at levels at least equivalent to peer institutions.
 - a. We must be willing to transform the institution (our behaviors, our reward systems, our business practices) to be a player in the new world of intra- and inter-institutional collaboration and cooperation.
 - b. The commitment must be institution-wide, both horizontally and vertically.
 - c. UCLA must fund mechanisms and support systems to encourage faculty to use and extend the CCLE.
 - d. Definition of all levels of funding will be determined during the detailed planning phase.
3. The CCLE must be an open environment that supports on-going development and allows for local customization.
4. The CCLE must support deep integration, so that functions within the system are aware of each other, and so that functions within the system are also aware, to the greatest extent possible, of common programs used by our users in their various roles over time.
5. On-going development, training, and support as well as continued collaboration between the technical and functional stakeholders are integral to the long-term success of the CCLE.
6. Once the report has been accepted and adequate funding allocated, we envision a three-year phased transition from the current situation of decentralized course management systems and

collaborative platforms to the adaptation, successful integration, and majority adoption of a common collaboration and learning environment.

7. CCLE development efforts at UCLA should build upon international development efforts and comply with the appropriate international technical and data standards.
8. UCLA should support the active and disciplined participation in and contribution to a single CCLE development framework.
9. The functional requirements as described in the report are a high-level representation of the functions that the CCLE must provide and can serve as an adequate basis for the detailed planning phase to follow.
10. The CCLE will require the four conceptual architectural elements of course/collaboration tools, campus data and services, common standards-compliant interface, and identity management and access control, as described in the report.
11. The design principles as described in the report are a high-level representation of the philosophy that must underlie the CCLE and can serve as an adequate basis for the detailed planning phase to follow.
12. Successful realization of the CCLE requires UCLA to create the infrastructure to support it, including a new culture that rewards collaboration and cooperation, and to address institutional barriers that may impact the success of this endeavor.

In summary, the FSG and TSG jointly recommend that UCLA converge on a single open source platform as the standard campus solution for the CCLE course/collaboration tools. The platform should conform to all of the principles set forth in this report. During the convergence phase, significant efforts should be made to guarantee interoperability between the selected platform and other systems extant at UCLA that are critical to the wide-spread adoption of the CCLE. We further recommend that the FCET periodically review the CCLE to ensure that the goals outlined in this document are being substantially met.

Although it is not clear who will be involved in the detailed planning phase, the FSG-TSG identified several suggested actions for the FCET to consider for the next phase. The key emphasis is on taking action quickly and ensuring the work progresses in a timely manner.

- Quickly assess the open source platforms for the standard campus solution for CCLE course/collaboration tools (by September 15, 2006).
- Quickly assess the existing frameworks used by other universities to act as the common standards-compliant interface.

- Begin assessing resources required and allocate staff to build the CCLE and implement the agreements above (by January 2007).
- After reviewing the Sakai Pilot report, decide immediately whether to continue investing in Sakai efforts during the assessment and planning phase, and consider investing in other open source platforms and efforts such as Moodle for an expedient parallel assessment. (June 2006).
- Immediately engage the faculty to identify their priorities and use cases (June 2006).

The FSG-TSG identified several areas that may need to be addressed, though the groups did not have time to do so. We offer these too as possible suggestions for the FCET:

- Develop a glossary to clarify terms, i.e., CCLE, deep integration, training and support, platform, central, framework, disciplined and active, etc.
- Document planning assumptions for the CCLE.
- Outline CCLE measures of success to inform ongoing assessment. For example, the FSG-TSG felt that an adoption rate of over 50% of the campus in three years would be a measure of success.
- Consider a policy statement to clarify the “opt in” nature of the CCLE, such as “The CCLE design in this document is intended to service the widest possible campus population. While it is highly recommended that all campus departments should use the selected tools, it is acknowledged that in some cases alternate CCLE tools will be required to fulfill special needs and requirements. Therefore we recommend policy should support non-mandatory participation in the campus CCLE. “

Philosophical Principles

The Functional Sponsors Group (FSG) was charged with the task of identifying the functional criteria for a system that will provide an integrated environment for a common collaboration and learning environment (CCLE) across the university. The challenges inherent in this task are significant, both in the overarching philosophy that informs such a task and the identification of specific functions that such a system needs to encompass in order to attract and keep a significant user pool at the university. Over the course of our meetings during the winter and spring quarters of AY 2005-2006, the FSG discussed these issues at varying levels of detail—from the most abstract to the very specific.

We agree with the FCET's recommendation "that the campus should converge on a common collaboration and learning environment" (from charge letter). Furthermore, we recognize that, from an instructional perspective, the atomized "status quo" does not provide an environment consonant with the stature of UCLA as one of the nation's leading universities. Although the proposed convergence is clearly an ambitious task that will take time, dedication and a careful consideration of available resources to achieve, we believe that the dividends of this investment in establishing a university-wide CCLE will be significant. The implementation of the CCLE will further align with the publicly stated priorities of the university in regards to educational technology. There are several ideals that have come to inform our discussions and we believe it is imperative that any system that receives the endorsement of the university conform to these ideals. Some of these ideals are admittedly philosophical, and propose a direction that the FSG believes is in the best long-term interests of the university community. Other ideals are more pragmatic, yet of equal importance. The FSG believes that it is of paramount importance that the CCLE has the user experience in mind from the start. The FSG interprets the term "user" broadly, to encompass the full gamut of university constituents -- faculty, students and staff. Well-designed and intuitive user-interfaces and a very short learning curve for faculty, students and staff are of utmost importance if any CCLE is to experience widespread adoption. Excellent design presupposes that the CCLE will allow for a high degree of customization, yet still provide users with a consistency in look and feel across sites—users will know that they are in the UCLA CCLE, yet they will also recognize that the specific needs of their group can be addressed within that environment.

The FSG has come to recognize that no single system from any single commercial vendor incorporates both the functions and the possibility for customization and fine-tuning that our group has deemed necessary for a dynamic teaching, learning and collaboration environment to

thrive at UCLA. Nevertheless, the FSG believes that the selection of one or two open source platforms will advance the process considerably and move the university toward achieving the critical CCLE goal. We further believe that a prudent selection of such platform or platforms will help the university focus resources and foster creativity. It is likewise imperative that the university recognize that this process will be a gradual one, and one that will require a significant investment of resources, not only for infrastructure, but also for software development, migration of existing systems as well as user and staff training.

There are three main philosophical underpinnings to the recommendations of the FSG:

- The CCLE must be an open environment that supports on-going development and allows for local customization.
- The CCLE must support deep integration, so that functions within the system are aware of each other, and so that functions within the system are also aware, to the greatest extent possible, of common programs used by our users in their various roles over time.
- On-going development, training and support as well as continued collaboration between the technical and functional stakeholders are integral to the long-term success of the CCLE. Once the report has been accepted and adequate funding allocated, we envision a three-year phased transition from the current situation of decentralized course management systems and collaborative platforms to the adaptation, successful integration, and majority adoption of a common collaboration and learning environment.

An Open Environment

A main concern that the FSG has identified is the need for the proposed CCLE to be an open environment. Although open source systems such as Moodle and Sakai are the two systems that seem to be most aligned with the open environment we envision, it is quite possible that other proprietary systems might have underlying development philosophies that align with this open environment philosophy. One of the key components of an open environment is the ability of local developers and local users to be able to contribute to the ongoing development of the system in a timely manner. The idiosyncratic needs of faculty from a dizzying array of disciplines teaching students at all levels of sophistication requires that local units be able to develop and deploy functions within the unified CCLE. Below, we provide a series of use case scenarios to illustrate more clearly this point. Similarly, because teaching and collaborative environments are dynamic, and can change quite quickly, the CCLE has to be able to respond quickly to the needs of the users. Accordingly, the FSG strongly endorses a position that allows users to “tinker” with the configuration of functions without the need to both appeal to and work through developers,

programmers or other computing personnel. In many of our discussions, we used the system-neutral term “tree-frogs” to describe features that could be added or taken away from various tools (e.g., a print feature that can be added to tools such as bulletin boards, discussion boards, announcement sections, etc.); these features are, like tree frogs, intended to be “sticky” across tools, and allow users to add a degree of customization that makes the CCLE perfectly suited for the goals of that group. The ability to customize should extend to the users’ ability to make visible or hide tools that appear in any particular collaboration group or course site; reasonable defaults for standard sites are a good idea, but they should be easily changeable by the appropriate users—both the selection of tools, and the selection of features within a tool.

Deep Integration

Another main concern that the FSG has identified is the ubiquity of certain personal productivity applications (such as word processing, email in all of its flavors, and calendaring systems) and discipline specific tools (such as statistical applications, simulation and modeling systems) in the daily lives of our users. Since it is both unlikely and ill-advised to try to substitute new applications for the extensive array that already has a wide degree of adoption, it is imperative that any CCLE we choose be able to play well with or even integrate with these existing applications. In particular, the need to be able to synchronize personal schedules with course or project calendars in a meaningful manner in the CCLE is a key to a successful collaborative environment—one can imagine a calendar within the CCLE that is aware of any date/time specific additions in any of the functions within the CCLE, and also able to synchronize with other calendaring data stored in external productivity tools. The need for the CCLE to play well with a wide array of email systems is important as email—despite its obvious flaws—currently stands as the main collaborative platform at this university and beyond. There are numerous other widely-used applications from different disciplines that pose similar challenges. For example, the CCLE must work well with Latex, an application that is essential to foster collaboration among all users requiring mathematical symbols as a natural part of their communications. In short, deep integration is an essential aspect of the proposed CCLE.

Training and Development

A core principle of the CCLE is an intuitive user interface. It should be so simple and self explanatory that the occasional user can open the site and see immediately what steps are to be taken to do a very basic course or project set-up. But to achieve the full value of the CCLE, a significant, long term investment in training and on-going development will be critical if the

adaptation of a university-wide CCLE is to succeed. Training of faculty, students and staff in the value of the CCLE is of paramount importance. Within this context, it is important to recognize the value of face-to-face training of individuals and groups, as well as the value of online tutorials. Similarly, the CCLE should include a suite of frequently updated FAQ pages that provide guidance on system features and navigation. A considerable investment should be made in educating the faculty on how the CCLE can add value to their pedagogical and research enterprises. Faculty buy-in to the CCLE may well need to be incentivized. One component of this incentivization could be appropriate recognition at the departmental, divisional, college or university level during the personnel review process of the consistent, wide-scale or innovative use of the CCLE. Furthermore, we believe that once faculty members understand the potential pedagogical and research value of the CCLE, they will be eager to make time available for training.

Students (undergraduates and graduates) will also need training in the use of the CCLE. They will also need consistent avenues of support since there is currently no clear support mechanism for students who encounter problems with their course management systems. Other aspects of training should focus on pedagogy and development of specific tools to address specific issues. Part of this training should include instruction in how to make the available tools fit the needs of user groups (rather than the current state of affairs where users fit their goals to the constraints of the available systems).

Along with training, the university will need to commit considerable resources to ongoing local development. Incentives for local developers to develop to the CCLE are as important as incentives for instructors. As our users become more adept and more sophisticated in their use of the CCLE, they will expect more sophisticated tools. Consequently, if the CCLE is to succeed, the university should be able to provide resources to assist these instructors in an expedient manner (development in terms of weeks and months, not years).

Technical Architecture and Design Principles

The Technical Sponsors Group (TSG) has discussed the technical infrastructure needed to meet the functional goals and core features defined by the FSG in this report, especially the components needed to support integration, collaboration, and innovation. The TSG deliberations were informed by interviews with staff who support learning technologies here at UCLA as well as staff at comparable institutions across the country. The TSG has concluded that the Common Collaboration and Learning Environment will require the following conceptual architectural elements:

1. Course/collaboration tools

A core set of tools and services for describing and managing learning and collaboration groups should be provided, each with well-defined data elements and APIs for integration and local extension. The core set of tools and services must have an open design such that they can be replaced or extended by local solutions within academic departments, to meet specific local needs with local expertise. A campus system which provides this core set of tools will be provided as a standard campus solution, which any academic department may choose to adopt. Any academic department which chooses instead to use a local system will be asked to support the core set of data elements and APIs as minimum integration capabilities.

2. Campus data and services

Core campus resources should provide data and services that facilitate learning and collaboration through well-defined data elements and interfaces, supporting real-time information, as well as allowing appropriate update of information. Student Services roster information, BruinCard student photos, and Library resources, for example, need to be exposed and delivered in a standard way that can integrate easily with the course/collaboration tools, while course/collaboration tools information should update Student Services with grading information dynamically.

3. Common standards-compliant interface

A well-designed flexible interface that packages the CCLE with other academic resources is a key element for a successful CCLE. The set of technologies needed to provide this interface consists of a customizable presentation layer that supports industry-wide

protocol standards to provide different user experiences for different audiences, and middleware components that support the UCLA-accepted interface protocols to allow integration of the CCLE with the presentation layer, academic information services, and other information resources.

4. Identity management and access control

All aspects of the CCLE need access to a single ID space for logon, and to user attributes such as class membership which allow appropriate scoping of access to resources and services. Instructors and collaboration group leaders should be able to easily add non-UCLA participants to the ID space.

The TSG has also concluded that the Common Collaboration and Learning Environment should meet the following technical design principles:

1. Data elements and APIs should reflect industry and community standards wherever possible.
2. All of the CCLE components must be open enough and flexible enough to grow and change, so that the CCLE does not immediately become a “legacy” system, with limitations that inhibit service and innovation.
3. All four of the CCLE architectural elements, including campus data and services, must be open enough and flexible enough to respond nimbly to evolving needs, and able to easily adapt to changes in other applications with which the CCLE must interoperate.
4. All components of the CCLE must be maintainable and sustainable, at a realistic cost, with the appropriate staffing.
5. Mobile access to CCLE tools and services must be supported.
6. The course/collaboration tools should support the ability to develop and integrate tools developed in multiple programming languages, such as Java, PHP, and Ruby.
7. Each faculty member should be able to decide which CCLE content is available for public view and which is restricted to specific people (class members, specified colleagues, research partners and the like).

Collaboration and Planning Principles

Both the FSG and the TSG identified collaboration and planning as crucial to a successful CCLE. The following principles should govern both implementation and ongoing enhancement:

1. Definition of CCLE data elements and APIs should be a collaborative process, drawing on expertise throughout the campus.
2. Strategies for development should encourage creativity and innovation. For example, tools and procedures should exist to support sharing of specialized tools created locally, and for forming workgroups to enhance existing tools.
3. As core parts of the academic technology infrastructure, all four of the CCLE architectural elements must include campus stakeholders in design decisions and the setting of development priorities.
4. The FCET should conduct ongoing assessment of the CCLE to ensure that it remains effective and relevant, considering functionality, risk assessment and cost.

Use Case Scenarios

As a means of addressing specific goals for the proposed CCLE system, we offer a series of use case scenarios below in three areas: instruction, collaboration and administration. Each of these sections is prefaced by a short discussion of functions for each of these. These discussions outline baseline functions, functions that members of the FSG deemed desirable, and long-term hopes for functions that we can imagine, but have not yet seen in any existing system.

The TSG has analyzed each of the tools listed in the three areas and marked as “Global” any that are appropriate for provision as a common service. Such global tools will include a core set of data elements and a core set of APIs for integration with campus services and with other common global tools (core data elements and core APIs still to be defined). Each global tool should be provided as part of a campus standard solution, which any academic department could choose to adopt. Any academic department which chooses instead to use a local system will be asked to support the core set of data elements and APIs as minimum integration capabilities. Departments which use the standard solution but choose to replace or extend one or more of the global tools, will also be expected to support the core data elements and APIs.

Any tool marked as “Local” by the TSG will also include a core set of data elements and APIs, and will be provided as part of a campus standard solution, just as the global tools are. These tools, though, are those the TSG considers the most likely to be replaced or extended by local solutions within academic departments, to meet specific local needs. Any local tool replaced or extended will be expected to support the core set of data elements and APIs required for integration.

TSG also estimated a “time to implementation” for each of the tools, marking each as:

- Short term, doable with existing technology
- Middle term, doable with some development
- Long term, not clear yet how to accomplish

TSG re-affirms that all of these tools are to be provided to faculty as enabling technology they may choose to adopt, not as required features for every course or collaboration site.

Instruction

Deployment of the CCLE in instruction is the driving force behind these current discussions. Anyone perusing the “edutools” site (<http://www.edutools.org>), a site that is geared toward instruction and that provides an excellent overview of existing course management software, is struck by two things: (1) the seemingly large number of CMS systems already available and (2) the surprising overlap in baseline functions for all of these systems. Baseline functions include communication tools, productivity tools, administration tools, course delivery tools, and tools that assist with curriculum design. The FSG is in general agreement that the map of functions for CMS at “edutools” provides an accurate snapshot of baseline functions for any CMS. Yet, the FSG also feels that these tools are often inflexible and do not allow instructors an opportunity to structure alternative approaches to and relationships between individual elements as a means to reinforce specific course goals. The tools that such a system needs to have to be considered for adoption include the following. Comments in parenthesis are refinements that the FSG believe make for a good example of such a tool.

- Syllabus tool (easy upload; link between syllabus tool and online repositories of readings; link between syllabus and calendar; gradebook aware—grading system in syllabus synchronized with gradebook)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Calendar tool (see below in collaboration)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Announcement tool (easy configuration; selection of distribution criteria; ability to email group roster along with posting announcement)
TSG Comments: Global (appropriate for provision as a common service); Short term (doable with existing technology).
- Discussion tool (intuitive configuration; ability to concatenate threads and print them; ability to add audio and video discussions from within system; ability to upload and annotate non-text media; calendar aware; gradebook aware)
TSG Comments: Local (likely to be replaced or extended by local solutions); Middle term (doable with development): discussion, annotation, blogging; Long term (not clear yet how to accomplish): annotate non-text media.

- Resources (ability to discover and include Library resources and resources from other sites within the CCLE system; ability to set permissions for others to access and manipulate resources; ability to easily post/deliver course related resources including lecture notes, presentations, lecture audio/video)

TSG Comments: Global (appropriate for provision as a common service); Short term (doable with existing technology): eReserves; Middle term (doable with development): Other features.
- Ability for faculty to drag and drop a large number of files quickly and easily, and arrange the files in folders, as they can do with WebDAV (easily and intuitively configured, without the need for arcane connection rules)

TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development) OR Long term (not clear yet how to accomplish). TSG suggests investigating how Yale has solved this issue.
- Assignments (calendar aware; gradebook aware; ability to designate open/close dates; allow for late submissions; student upload of various types of files; ability to comment and release comments online)

TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Quiz / exam (calendar aware; gradebook aware; ability to make question database that is not only text files; ability to access question database over numerous iterations/numerous CCLE sites dependant on permissions; ability to structure and deliver complex exams online; ability to fine-tune scheduling of exam delivery)

TSG Comments: Local (likely to be replaced or extended by local solutions); Middle term (doable with development), with the possible exception of “ability to structure and deliver complex exams online.” Depending on what is meant by “complex,” this could be Long term (not clear yet how to accomplish).
- Course evaluation

TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development). TSG notes that there is a long history on campus of debate on making faculty evaluations available to students, so issues of policy and faculty participation are more challenging than the technical issues in implementing this tool. TSG believes that sensitivities and concerns can be addressed. TSG notes that student return of evaluations is much higher if the evaluation is done in class rather than offered as an online option at other times.

- Gradebook (calendar aware; syllabus aware; aware of other tools such as discussions, assignments, quizzes and exams—grade once, instead of multiple times; user configurable time-out; intuitive interface—easy to structure assignments)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Media repository (available to store digital media files; available to store and retrieve associated meta-data; easy integration with lecture development)
TSG Comments: Global (appropriate for provision as a common service); Short term (doable with existing technology), except for easy integration with lecture development, which is Middle term (doable with development).

Instruction Use Cases

To illustrate some of the functionalities outlined above, we have assembled several different scenarios. Each of these use cases highlights features that are not generally available in the existing CMS tools.

1) Integration of quiz tool and gradebook

An instructor designs a course using a blended learning model combining lecture and online material. A self-assessment quiz tool draws from a data bank of questions. Feedback to the student guides their study and provides the instructor feedback regarding topics requiring more in-depth explanation. The instructor links the topic outline in the syllabus to the specific self-assessment for each topic. In addition, the instructor requires the following features associated with its quiz function: ability to generate a random quiz from a bank of questions or problems; an editing tool to enable the production of the quiz items, including importing from other sources; ability to track student scores; a gradebook for maintaining scores and ability to choose the better score; seamless integration with the university gradebook; summary and profiling of scores to assist the instructor in planning the follow-up lecture.

2) Ability to upload non-text media to discussion board

A course in geology includes a lot of problem solving, using both diagrams and mathematical equations. Here the weekly assignments are done individually by the students, but many seek help in solving the problems. This course requires a discussion board where students can ask about a particular assigned problem and the professor can respond with a quick diagram and a few equations to help the student get started in the right direction. The ability to upload

non-text media directly from a tablet (with no need for scanning) is essential for faculty to respond in a clear and timely manner.

3) Incorporation of digital media into course documents or quizzes

An instructor in a molecular biology class uses three dimensional models as part of quizzes. The quiz tool, as well as other tools in the CCLE, readily incorporate models that the instructor drags from their local machine into the resource area of the CCLE. In this class, three dimensional structures of molecules and macromolecules (e.g. proteins) are particularly important to help the students visualize these structures. The visualizations are frequently integrated into course content and quizzes. The CCLE handles this well because ready integration of Rasmol or Chime (3D structure programs) into a quiz function is part and parcel of both the quiz tool and the resources area.

4) Capability for student searches

A student is working on a paper for her upper division class in Political Science. While she is writing, she remembers contributing to an online discussion of a related topic, and thinks that it was for a Philosophy class, but she is not sure. She logs in to the CCLE and clicks on "show me all my contributions to discussion boards," then searches for a phrase, quickly finding the discussion she had in mind, which turns out to have been for a Community Health Sciences class, not a Philosophy class. Because the CCLE is an integrated, single environment, the student has access to all her work from the past.

5) Capability to organize and print discussion topics

A faculty member assigns weekly discussion topics to his class. He then uses these to structure the in-class discussion. Accordingly, he needs to be able to (1) schedule available dates for a discussion topic and (2) concatenate all of the replies to a topic in a file, reorganize it, and then print it out. The discussions topics are, of course, archived, and can be accessed from the "student view" screen in the administrative side of the site, facilitating student grading—since he sees that Amy has only submitted 6 of the 8 required discussion topics, he is quickly able to adjust her grade for the quarter.

6) Personal online database and bibliography creator

An upper division undergraduate student taking a psychology course and doing research on congregate housing wants to create a personal database online, importing references

automatically from multiple databases. Her goal is to better organize and manage her references. She also wants to share her references with a classmate doing research on housing the mentally frail. She doesn't have time to spend hours formatting bibliographies and manuscripts. Using the Internet makes it easy for the student to share her references. Collaboration with classmates, members of her own department or institution, or globally with other researchers, faculty members, etc. is no longer a dreaded process. Being able to generate accurate, concise bibliographies has definite advantages, facilitating the research process and guarding against possible plagiarism issues.

7) Resource discovery

Matt, like many of his classmates, has embraced Google Scholar. In fact, he turns to Google Scholar for a variety of informational and instructional services. Matt rarely goes to the UCLA Library, although he considers himself a regular Library user. Matt uses the Library virtually, accessing electronic resources from his home. Matt can't understand why the Library can't find new, more seamless ways of making its holdings more easily discoverable and accessible. More importantly, he can't understand why the Library's collections and services aren't integrated into course management systems used by his professors. Matt wants anytime/anywhere access to electronic, print discovery, audio, and video information. Matt's friends couldn't agree more. They expect sophisticated informational and instructional services, particularly those that are Web based. In fact, Matt's best friend at another institution says that he can access and use his library's collections and services wherever - - in learning systems, portals, scholars' workstations, and personal productivity tools.

8) Quick-start training

A department offers studio-based courses that are often staffed by visiting faculty. While aware of some of the advantages of the CCLE, the visitors have no interest in learning any involved set of operations. The CCLE must offer a basic set of integrated services that are quickly learned and easily implemented without local support staff.

9) Customized training

A department uses TAs extensively to offer multiple sessions of a three-quarter sequence course. The TAs are drawn from several departments and need to learn a highly-adapted version of the CCLE in order to fulfill their responsibilities to the course. The CCLE must allow

customized, but consistent, formatting for each section of the course, and an ongoing training program for each new generation of TAs must be easily developed.

10) Capability for anonymous student feedback

An instructor has developed four interactive exercises for her upper-division course. Two of the exercises also incorporate lab work. The instructor is sensitive to the weak points of these innovative exercises, but isn't certain how students will respond. She would like to survey the students at the same time that they are working on the exercises rather than wait for a retrospective summary at the end of the quarter. The CCLE must allow both specific and open-ended questions about the exercises to be collected, validated, and analyzed while maintaining student anonymity.

11) Master calendar

A student uses the master CCLE calendar to plan her week's study schedule. Since all of her courses and assignment due dates display on the one calendar, it makes planning much easier.

12) Capability to post very large files

For a class in Design and Media Arts, 30 students must submit virtual reality projects, with file sizes of more than 1 Gig each, for mid-term assignment and again for the final grade. The CCLE must support the ability to upload many very large files with adequate performance and response time.

Collaboration

Collaborative systems for university research are far less developed than course management systems and the functional set has been less described. Accordingly, the FSG has developed our own base-line ideas about functions for such a collaborative environment, recognizing at the same time that the distinction between a collaborative and an instructional environment is at times slight. Accordingly, some of these tools overlap with the tools mentioned in the Instruction section above. Our use case scenarios below highlight how these tools might be deployed differently in research collaboration than in an instructional environment. Similarly, some of the tools listed below might be equally useful in an instructional environment.

- Calendar tool (aware of numerous other tools—see above; ability to synchronize with other applications not inside the CCLE system)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Access control (see below in administration)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Group Management (ability to create group workspaces on the fly independent of course rosters and/or as a subset of a class, with members on and off campus)
- Version control (for all types of digital assets; ability for group members to check in/out assets)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
- Intellectual network discovery (based on profiles for all UCLA users; ability to include/invite people to join groups easily)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development). TSG notes that participation and policy issues would have to be addressed before implementation.
- Profiles (automatically generated; easily updated; roster aware)
TSG Comments: Global (appropriate for provision as a common service); Short term (doable with existing technology) using existing data. TSG notes that this feature depends on ongoing maintenance and updating of the information, and that participation and policy issues would have to be addressed before implementation.
- Synchronous collaboration (shared desktop)
TSG Comments: Global (appropriate for provision as a common service); Short term (doable with existing technology) using existing data.
- Audio/video collaboration (archiving of sessions to media repository)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development). TSG notes that the University of Lancaster has a Sakai tool to do this function in beta test.
- Resource discovery (discovery and harvesting of assets; close integration with Library search and discovery systems)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development)

- Bibliography (create a personal database online; import reference automatically from multiple databases; organize and manage references; share references; format bibliographies and manuscripts in seconds)
TSG Comments: Global (appropriate for provision as a common service; Middle term (doable with development))
- Budget creation (supports templates for various extramural agencies; able to harvest appropriate local information related to indirect costs, and titles/pay scales)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development. TSG notes that the InfoEd system will support budget creation, and should be deployed to campus departments in the next year or two.
- Publication (white papers; working papers; other assets ready to be released in finished or near finished form)
TSG Comments: Global (appropriate for provision as a common service; Middle term (doable with development), for automatic posting to eScholarship and selected discipline repositories.

Collaboration Use Cases

1) Resource repository

A UCLA research group works together on numerous projects. Items related to the projects are stored in a resource repository. Items may include documents, presentations, images, video, datasets, and other assets. The repository needs to collect and manage the copyright status of the resources it contains. Because of copyright restrictions, not all items can be uploaded into the local repository, so the system needs to support having a URL to an external resource appear in place of an uploaded file. One group member is asked to share his resource recommendations with the group, and to create a subset of this list to share with their industry partners. The group reviews the resources, individuals update documents they are responsible for, and the final list is edited down to make it available for a public research review, posting only bibliographic information for resources that have copyright restrictions. The repository makes this task easy with versioning control for document changes, and with a user friendly wishlist-like interface where searches of the repository can be batch added to a customized list and individual items are easy to add and remove, without compromising the source repository. Access restrictions to these custom lists are at the full control of the individual creating the list. Ideally, the group would be able to export the bibliographic information for these resources to common bibliographic management systems. The repository should allow the users to tag and categorize resources by

keyword and by locally defined categories. After bringing a resource or an entire project to a certain level of development, a group member needs an easy way to move resources from his/her private work area (on a local PC or in a private space in the collaborative environment) to an area that is shared by the group. Later, the group members may need to move those resources to an area that is viewable by the public. They need an easy way to mark or reassign private resources as group resources and group resources as viewable by public. They need the ability to present those public resources to an audience that is not required to log on to the collaboration tool.

2) Collaboration with internal & external partners – common platforms

a. A graduate student from the Department of Sociology, a faculty member from the Department of Political Science, and a researcher from the School of Public Health are collaborating on a project dealing with the political mobilization of HIV-infected populations in Mozambique. The CCLE provides them with document versioning control, allows them to easily share complicated datasets, and to communicate both synchronously and asynchronously. Of great benefit has been the ability to archive video conference sessions with workers in the field. Later, the team uses features of the CCLE to publish their working papers to colleagues working on similar topics. Tools in the CCLE allow the researchers to quickly pull together PowerPoint presentations for conference presentations, and to print various research summaries for poster sessions attended by their research team. Given the large number of people working on the project, it is fortunate that the CCLE has a sophisticated versioning control and check-in/check-out system, easily configured by the PIs attached to the project.

b. Another UCLA sponsored research group in nanosystem design has external academic, government and industry partners. The group collaborates with the partners in creating documents and presentations. In order to work effectively and, given the nature of the work, securely together, each group member or partner has varying degrees of access to resources housed on a disparate series of servers, but only accessible as a whole within the group's collaborative environment.

3) Integrating user-developed tools

Members of a research group have developed a web application that allows researchers to monitor nesting boxes at a local nature reserve, and to make field notes based on the real-time data. This tool is “hosted” within the collaborative environment in such a way that it integrates well with the other tools in the system. This custom, user-developed tool makes use of a single-sign-on (SSO) function so the group members do not have to login multiple times. The research

data is kept secure in transit through encryption (https). The researcher that developed the tool has the option to make it (minus the group's data) available to another group interested in testing the tool with a K-12 classroom at a local school.

4) Campus-wide network and resource discovery capabilities

a. A graduate student or faculty member is looking for potential research partners at UCLA. Opportunities for collaboration, such as this one, are hindered with the current situation. A solution is the development of a one-stop, comprehensive information portal with information on faculty and graduate student research and teaching. The information design and style of this particular portal (examples could include such networking websites as www.myspace.com) can be determined later, but certain elements of both standardization and flexibility/adaptability are needed.

b. An undergraduate student wants to find information about various courses offered across school and departmental levels. The course catalog and schedule of classes are a start – however, a centralized portal would be useful, with links to department websites and course websites, with course descriptions. Additional information, including instructor and student comments, and course history could be added. Having interactive capabilities (blogging, bulletin boards, etc.) available as well can make this portal a type of “networking tool” for both graduate students and faculty across disciplinary boundaries.

c. A graduate student or faculty member wants to find out about various research projects on campus, and opportunities for participation and collaboration in both intra-disciplinary and inter-disciplinary efforts. A similar portal (or part of the same portal) would include links to, and information about on-going campus research projects. Again, interactive and communication capabilities will be useful in enhancing the use value of this initiative.

5) Budget creation tool

In the Chemistry Department, three research groups are writing an NIH grant for a joint project. Using the CCLE, they are able to not only modify the grant proposal collaboratively but are able to easily assemble the budget. Using a budget tool, they select the NIH format and then link to university information, including benefits, salary levels and other institutionally determined inputs. The grant complete with its budget is assembled with minimal administrative assistance.

6) Calendar/schedule management

a. The UCLA Basketball team uses the CCLE to manage its calendar/schedule and schedule meetings at times convenient for them all. The calendar contains information on all teammates schedules and is able to import from school calendar of events so that if there is a speaker, they can incorporate this into their working calendar. Using the ability to drag and drop email events to the calendar simplifies calendar management and reduces reentry of times. The members of the squad find particularly useful the feature that allows them to download the data and synch it to their PDA.

b. A student is scheduling a meeting with her three class teammates and needs to be able to see their calendars to find times convenient for them all. Her calendar also needs to be able to import from the school calendar so that she can incorporate, as well as automatically display, her course schedule. Ideally the student can download and synch her Palm or other PDA with the calendar tool.

Administration

Many current course management systems incorporate certain administrative functions, yet some of these functions have little applicability to UCLA. At the same time, there are many administrative functions at UCLA that are at present not covered within course management systems. If a CCLE is to be successfully implemented, there is a real need for many disparate systems at UCLA to begin to play better together. Single sign-on will of course be a giant step in the right direction but that is only one step on the way to true integration of numerous administrative functions that will benefit faculty, students and staff, as well as other administrative entities at UCLA. Accordingly, such functions are essential to the success of any CCLE.

- Single sign-on with user chosen user-id (users do not need to see or be forced to use long seemingly random strings of letters and characters)

TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).

- Ability for faculty to drag and drop a large number of files quickly and easily, and arrange the files in folders, as they can do with WebDAV (intuitive set-up on multiple platforms w/o need for VPN)

- TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development) OR Long term (not clear yet how to accomplish). TSG suggests investigating how Yale has solved this issue.*
- Gradebook (user defined time-out; intuitive set-up; see gradebook features above)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
 - Student view (ability to see all work done by a student in a given class; ability to grade student work from student view screen)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development),for the Global tools; Long term (not clear yet how to accomplish) for Local tools, depending on how implemented
 - Group formation / permissions / access control (ability to easily add/drop members; ability to easily configure members into various groups with differing permissions for read/write access to various assets)
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
 - Rostering (profiles aware—see above in Collaboration section) and seating charts. The roster should provide biographical information as well as a picture (similar to the BruinCard).
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development).
 - Report generation
TSG Comments: Global (appropriate for provision as a common service); Middle term (doable with development). TSG notes that, in addition to pre-defined reports, APIs should be provided for locally-defined report.
 - Training
TSG Comments: Global (appropriate for provision as a common service) AND Local (likely to be replaced or extended by local solutions); Middle term (doable with development). The TSG suggests formal usability testing as part of implementation, and an iterative process of interface improvement.

Administration Use Cases

1) Cross-class function

a. Two courses on America since 1960 are offered and use overlapping materials. Using the CCLE, the faculty member teaching this course is able to upload these materials once and then make them accessible to students in two different classes. As some of the materials are copyrighted, access is limited to students enrolled in one of the two courses. However, other material is not copyrighted and access is allowed for anyone searching the CCLE.

b. Students taking one or more related courses want to import and expand upon personal databases of research they've started to develop for another class. Cross-class function enables them to incorporate work across the spectrum of their courses, from quarter to quarter, and indeed throughout their academic career.

2) Help desk

A faculty member discovers that students are having a hard time accessing the course website due to technical issues. In the current situation, students turn to the faculty member who often has no clue as to what might be wrong. In the new system, the students know exactly to whom to turn and can do so from their own portal homepage. The issue is resolved without ever having to alert the faculty member. A courtesy notice is sent to the instructor if the technical problems made it impossible for the student to turn in an assignment on time, and a flag appears next to the student's work that indicates that the late posting of the assignment was due to a technical gaffe.

3) Redundancy and backup

A technical flaw requires that the system be brought down but there is no interruption in service because there is a backup system that seamlessly takes over while the main system is being repaired. Similarly, later that week, when a major earthquake cripples Southern California, students are still able to continue working on the course websites, as these are all mirrored at a redundant, safe location, far away from the chaos embroiling Los Angeles.

4) Reports

A faculty member who is in charge of a language area in Asian Languages and Cultures, is puzzled by comments from students concerning the lack of a coherent internet strategy for asynchronous and synchronous delivery of course materials in first year heritage Japanese. Reports are generated showing that students in two of the five discussion sections never use the

audio discussion board, one of the five sections makes inordinately high use of the chat board, all five of the sections use the quizzing function frequently, and only one of the five sections frequently makes use of all of the functions that the program has agreed on for the curriculum. Using this report, the faculty member is able to retrain the lecturers, and target various sections to bring them in line with the overall curriculum.

5) Grading

a. A faculty member has a large number of assignments that must be graded during the course of the quarter. Some of the assignments are of the nature of "post 6 out of 9 possible discussion topics," and others are more straight-forward, such as research papers due in weeks 5 and 9. Along with a midterm and final, the number of grading points for each of these assignments are significant. The faculty member, to gauge individual progress, needs to be able to call up all of a student's work at once--a student view--that allows her to access the actual assignment postings, evaluate the individual student's progress, and adjust grades accordingly. These grades in turn feed in to the grading tool that, in turn, calculates a proposed grade and, ultimately, allows the faculty member to submit grades to the registrar.

b. A faculty member finishes his grading for a course late at night. Because he knows that his 2 year old sleeping in the next room has a nasty head cold, and wakes up every 30 minutes needing to be comforted, the faculty member selects the option "no time out" on his grading tool. This allows him to grade without worrying about the system timing him out and losing his work. The faculty member is actually presented with a pull-down of numerous time out options. Although the default is "20 minutes time out," the faculty member can select from a range of no time out all the way down to the extreme, video game-like "10 second time out."

6) Roster, users, permissions

A faculty member is part of a large, multi-university research group with both local participants and participants from various other institutions. There are several co-PIs, four post-docs each in charge of a sub-group, dozens of graduate students and even ten local UCLA undergraduates working in the project under the auspices of the SRP program. The PIs need to be able to add members at will and assign members various levels of access to the resources, discussions, and assets of the group. Furthermore, decisions about making project assets available to the public must be vetted through an internal review committee, consisting of the PIs and a subset of the postdocs--all depending on the documents to be released. The system allows the PIs

to configure this on the fly, adding members, changing permissions, and organizing people into groups, all as needed.

8) Tool use reporting

The IT unit is regularly asked to provide reports on CCLE tool usage and site activity. These reports are used for two purposes:

- aggregate reports on usage are forwarded to the Student Fee Committee which approves the student fee that helps support the CCLE.
- training personnel use the reports to identify areas in which faculty and students are having difficulty, or tools that are less used, in order to design better training modules.

The CCLE provides reports on tool usage with the possibility of drilling down to details on individual tools or individual classes.

9) Reports on real-time librarian chat use

Nancy's cross-cultural development professor has encouraged his students to use real-time chat when they have specific information, reference or research questions they can't resolve using Google Scholar or something similar. Nancy is confident that her classmates will benefit from this course-specific real-time chat. She wishes there was discipline-specific chat for some of her other courses. Connecting to a professional librarian who understands globalization and the print and electronic resources in that area would save her a lot of time.

10) Reports on the use of bookmarks

For her quarter project on tobacco marketing, Brenda has bookmarked a bunch of resources -- Web pages, full-text articles, links to associations and even links to archived advertisements -- but she's not sure she has bookmarked the right resources. She suspects she might have missed core resources, and is concerned that her professor will find her project comes up short in the documentation category. Brenda decides to show a librarian her bookmarks, just to check in. Maybe there is a different way to categorize and annotate them, and maybe there are important pages relevant to her topic and her course that she has missed.

11) Reports on course content and materials access

In information literacy planning, reports showing the number of times and the time and date on which each student, or all students in a course as an aggregated group, accessed course

content and supplementary materials including library resources and services, would position librarians to better follow and guide student scholarship, and ultimately to help instructors create their courses. The end result would be improved academic success for students.

Conclusion

The FSG believes that if a CCLE with the above functions were made available to the UCLA community, and the launch of the system were accompanied by significant training and incentives, it would be embraced by many new users. Furthermore, the TSG believes that agreements on data and interchange standards and the development of infrastructure for collaboration are achievable in the next few years, and an institutional commitment to this goal would help the UCLA community to leverage creativity and innovation across campus. We want to provide the campus with a common environment that allows faculty and students to use various tools in a consistent manner, in both their teaching and their research. We believe that making this system easy to use will foster the types of creative collaboration that is a hallmark of UCLA. Indeed, such an integrated CCLE would vault UCLA to the forefront of the current research university landscape. It will pay significant dividends as well, attracting even more of the best and brightest students, offer a supportive and attractive instructional and research environment for faculty, and make extramural collaborative endeavors even more attractive than they are now.

Appendix A: Charge to the Functional Sponsors Group

To: Functional Sponsors Group: Common Collaboration & Learning Environment

Timothy Tangherlini, Sponsor Group Chair, Scandinavian Section
Diane Favro, ETC and Architecture and Urban Design
Jason Frand, Anderson School
Lianna Johnson, Life Sciences
Larry Loeher, Office of Instructional Development
Kathy McGuire, University Extension
Richard Meng, Undergraduate student
Ajit Pyati, GSEIS Graduate student
Janice Reiff, History
Margo Reveil, Academic Technology Services
Joseph Vaughan, Center for Digital Humanities, Sponsor Group Facilitator
Sarah Watstein, University Library

External Participant: Kathy Christoph, Director, DoIT Academic Technology
University of Wisconsin-Madison

From: Jim Davis, Associate Vice Chancellor, Information Technology

Thank you for agreeing to participate in a Functional Sponsors Group as part of the campus-wide review process for converging on a common collaboration and learning environment for UCLA.

In Spring 2003, the Faculty Committee on Educational Technology (FCET) began the process of reviewing options for providing UCLA faculty and students with a common system that would support teaching and research collaboration. In Spring 2004, UCLA became part of a national initiative focused on precisely this same vision, the Sakai initiative and began a pilot project in fall 2004 to evaluate Sakai as a possible tool for broad deployment at UCLA.

In Spring 2005, the FCET recommended to the ITPB that the campus should converge on a common collaboration and learning environment. The ITPB has endorsed the FCET work plan to undertake a broad-campus review. Building on the work of the last four years, your charge is to present to the FCET by June 1, 2006, a joint recommendation with the Technical Sponsors Group for a common collaboration and learning environment for UCLA. Your report should include a summary of the information on which your recommendation is based, for example, the functional criteria you used, the solutions you considered, and other issues relevant to your decision.

cc: Alfonso Cardenas, Chair, ITPB
Patricia Keating, Chair, FCET
Executive Sponsors: Larry Loeher, Associate Vice Provost; Patricia O'Brien, Executive Dean;
Judi Smith, Vice Provost, Undergraduate Education;
Gary Strong, University Librarian

Appendix B: Charge to the Technical Sponsors Group

To: Technical Sponsors Group: Common Collaboration & Learning Environment

Eric Chang, University Extension, Sponsor Group Co-Chair
Vincent Riggs, School of Public Affairs, Sponsor Group Co-Chair
Mike Franks, Social Science Computing
S. Kumar, Anderson School
Michelle Lew, Office of Instructional Development
Arun Pasricha, Registrar's Office
Nick Reddingius, Office of Information Technology
Terry Ryan, University Library, Sponsor Group Facilitator
Eric Splaver, College Information Services
Albert Wu, Administrative Information Systems

External Participant: Mara Hancock, UC Berkeley, Associate Director, Learning Systems

From: Jim Davis, Associate Vice Chancellor, Information Technology

Thank you for agreeing to participate in a Technical Sponsors Group as part of the campus-wide review process for converging on a common collaboration and learning environment for UCLA.

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cc: Alfonso Cardenas, Chair, ITPB
Patricia Keating, Chair, FCET
Executive Sponsors: Larry Loehner, Associate Vice Provost; Patricia O'Brien, Executive Dean;
Judi Smith, Vice Provost, Undergraduate Education
Gary Strong, University Librarian

Appendix C: Interviews

The FSG and TSG conducted three sets of interviews which are posted on the Sakai FCET Collaboration site, under Resources.

1. FSG Interviews of UCLA Faculty

www.sakai.ucla.edu

FCET Collaboration / Resources / CCLE Interviews / UCLA Faculty Interviews (audio)

2. TSG Interviews of UCLA Learning Management System Managers

www.sakai.ucla.edu

FCET Collaboration / Resources / CCLE Interviews / UCLA LMS Managers Interviews (pdf)

3. TSG Interviews of Comparable Peer Institutions

- Harvard
- Illinois
- Michigan
- Ohio State
- Stanford
- Wisconsin
- Yale
- UC Berkeley
- UC Irvine
- UC San Diego

www.sakai.ucla.edu

FCET Collaboration / Resources / CCLE Interviews / Comparable Institutions Interviews