1.0 Introduction and Resource Sites

The NLII Spring Focus Session on Next Generation Course Management Systems was co-sponsored by University of Arizona and took place at the Marriott University Park in Tucson, Arizona. Readings, materials, and agenda are available on the NLII Focus Session Web site at http://www.educause.edu/nlii/meetings/nlii032/. Note: meeting participants completed pre-meeting readings and analysis; this information and other resources are available on the meeting site under “Pre-Meeting Preparations.” (http://www.educause.edu/nlii/meetings/nlii032/prep.asp)

2.0 Opening Remarks

Welcome: Roger Caldwell
College of Agriculture
Director of Educational Communications & Technologies, University of Arizona

Presenter: Carole A. Barone, Vice President, EDUCAUSE

2.1 The work products set as goals for the focus session included:

- A prioritized set of issues and recommendations associated with use of CMS according to learner-centered principles.
- A consensual set of functional requirements for next-generation CMSs.
The audience for the work products concerning next generation features was primarily commercial and campus software developers who develop course management systems.

2.2 The participants at the focus session included:

- Product managers for commercial software development (who are interested in understanding market needs and translating those into software requirements)
- Software developers on campuses (who wish to understand faculty and student needs and translate those into software requirements)
- Faculty and instructional designers (who wish to implement learner-centered teaching practices in their design/use of course management system learning experiences and course environments)
- Procurement and Academic Administrators (who are interested in including learner-centered functional requirements in their development of RFPs and selection of course management systems)
- Instructional technology support who are responsible for instructional technology infrastructure and faculty support (who wish to use their understanding of the teaching and learning uses to configure and support course management systems)
- Educational technology, usability and human interface researchers (who are interested in using the requirements for designing models and prototypes)

2.3 Common conceptual framework and rules of engagement

Operational assumptions for the focus session (which provided a common conceptual framework), were situated in the NLII’s Learner-Centered Principles, see http://www.educause.edu/nlii/keythemes/lcp/ (see further discussion in Section 3 below).

The rules of engagement included an agreement by participants to use the conceptual framework and focus on what CMS functions can best support Learner-centered Principles in future CMS development. The session was not focused on what doesn’t work in current CMS or why one CMS is better than another system (or as Dr. Barone stated, “No vending, no venting.”)

All participants were provided “idea cards,” to be used throughout the day to describe desired features of course management systems, and linking the features to the learning principles each would support.


Focusing Questions:
1. How can we create learning environments that are principle-driven, rather than technology or tradition-driven?
2. What do we truly know about learning and cognition and better practices for learning that can be applied to the online environment?
3. Using these principles, what are some of the most effective design, teaching and learning strategies that have been explored in the use of existing course management systems?
4. Where do course management systems need improvement in order to become learning management systems?

Presenter: Colleen Carmean, IT Director, Consulting, Arizona State University West
Introduction: As an NLII 2002 Fellow, Colleen Carmean worked with her colleague Jeremy Haefner to review the literature on theories about learning and cognition, to identify overlapping and common concepts, and from these to generate a set of five deeper learning principles. According to the principles they identified, deeper learning occurs when the learning experience is: social, active, contextual, engaging, and student-owned. They then evaluated how course management systems could be used according to these principles to create an effective learning environment. (See their EDUCAUSE Review article (November/December 2002), “Mind Over Matter,” [http://www.educause.edu/ir/library/pdf/erm0261.pdf](http://www.educause.edu/ir/library/pdf/erm0261.pdf) for more details on the deeper learning principles and their application to course management systems.) The co-authors then applied deeper learning principles to suggesting improvements for next generation course management systems in their EDUCAUSE Quarterly article (Vol. 26, Issue #1) “Next-Generation Course Management Systems.” [http://www.educause.edu/ir/library/pdf/eqm0311.pdf](http://www.educause.edu/ir/library/pdf/eqm0311.pdf) Finally, Colleen took the deeper learning principles, and constructed a concept map, [http://www.educause.edu/nlii/keythemes/lcp/ “Mapping the Learning Space”](http://www.educause.edu/nlii/keythemes/lcp/) to show the relationship among deeper learning principles, teaching practices, learning activities, design implications, and technology uses.

Teaching and learning in today’s online learning environment requires consideration of roles, perspectives and needs of many people. Instructors must utilize pedagogy that addresses the needs of a changing population with diverse learning needs in an environment with multiple means of connecting learners and instructors. Instructors are required to manage resources in new ways. Instructional designers must consider how tools within a system can be supported, provide opportunities for collaboration, and give access to resources within and across systems while making sure that users are not burdened by unreasonable demands on their time. Instructional support models and templates must reflect best practices and standards. Information technology systems wrestle with issues of security, changing systems and standards, structures of centralized support, and demands of providing quickly accessible tools and resources. Libraries are evolving into virtual centralized systems that support anytime anywhere access. Administration must find ways to balance economic realities with institutional assessment and the requisites for ensuring desired earning outcomes. Non-traditional students are now the norm and need access to peers, instructors, and course materials while being provided feedback and opportunities to developmentally grow. Vendors look carefully at the tug between effort and outcome while attempting to design sustainable innovations and make a profit.

The conceptual framework illustrated in the Learner-centered Principles [http://www.educause.edu/nlii/keythemes/lcp/](http://www.educause.edu/nlii/keythemes/lcp/) ties all of these perspectives together through deeper learning and a common vocabulary. It is critical that we set priorities with an authority of consensus. We can’t let what happened to the medical establishment happen to us in higher education. Because key stakeholders such as physicians did not get creatively involved in solving the deep structural problems in healthcare; the deep structural changes in healthcare were imposed on them without being informed by their values and professional wisdom.

The Next Generation CMS focus session, with the diversity of perspectives represented here, challenges us to think differently about how online learning systems are designed and operate. Next generation tools must reflect what is valuable across the curriculum and be accessible to all learners and through a variety of systems. New ways of operating require new instructional strategies and designs that include support and guidance for faculty.

The research that stipulates there is no significant difference between online and brick-and-mortar learning suggests that either we’re doing it wrong, we’re measuring it wrong, or we could be doing it better.
Audience Response:
Deeper learning means learning how to learn; we must let go of ‘coverage anxiety’. It is critical that we develop a shared vocabulary across systems and disciplines.

4.0 General Group Discussion: Conceptual Framework

Focusing Questions:
- What are our “rules of engagement” for discussion today?
- In what ways does the proposed conceptual framework need clarification? In what ways does it need to be changed for the purpose of our work product?
- In what ways does it need to be changed in the future to be a more complete framework for transforming teaching and learning with technology?

As a group norming process, small groups reviewed and discussed the Learner-Centered Principles and the NLII Glossary of Learning Terms and Theory within Learning Systems that provides the definitions of terms for describing key features and functions of an effective CMS (an example of a CMS feature would be “contains a gradebook”). The primary purpose of the glossary is to create a shared vocabulary and conceptual framework that will sustain productive dialogues involving the diverse perspectives of all the stakeholders, including the roles represented in the list in Section 2.2.

Suggestions for refining the vocabulary and conceptual framework included:
- Link the terms in the conceptual framework to the glossary, with operationalized definitions and examples.
- Provide a different view into the same conceptual framework (a hierarchical/taxonomical view).
- Show relationships between the elements; show how nodes relate to other nodes (visually; hierarchically) using hyperlinking
- Provide discipline-specific examples at the second level of the conceptual framework
- Explore the use of a Visual Thesaurus – such that an inquiry using a search term, would link to other words as you choose (take you on different paths)

5.0 Small Group Discussion: Analyzing CMS and Learner-Centered Principles

Facilitators: Nada Dabbagh, Steve Griffin, Marty Hewlett, Jean Kreis, Dan Volchok, Van Weigel
Rapporteurs: Darren Cambridge, Colleen Carmean, Gretchen Gibbs, Joan Lippincott, Patricia McGee, Vicki Suter, Dan Volchok

Prior to the focus session, participants had used the Principles Observation Tool (http://coehd.utsa.edu/users/pmcgee/nlii/learner-centered.doc) to observe the applications of the learner-centered principles within a course of their choice, delivered through a course management system. Based on this work (and using the Principles Observation Tool as an organizing structure), small group participants divided into randomly assigned groups designated by a color on their nametags and discussed the following questions:

1. What are some examples of principle-based use of your institution’s CMS?
2. What problems exist that can be attributed to use (or poor use) of your institution’s CMS that could inform us in our work for the day?
3. Most important question: What teaching and learning problems exist or persist that can be attributed to the design and architecture of current CMS, and could be addressed by new CMS functionality?
The work product for this discussion was a collection of cards describing issues/problems regarding the current use of course management systems and initial identification of features functions and policy changes that would improve our ability to use course management systems to support deeper learning. From the cards, each group developed a list of issues and recommendations. See following pages for a table summarizing small group outcomes.

5.1 CATEGORIES
(Note: the following categories were developed after the focus session by NLII staff, adapting categories suggested by Nada Dabbagh. Similar comments from different groups were combined, to better organize the meeting notes).

**Access Controls.** Relate to authentication and authorization functionality that determines how participants get into systems and what they are allowed to do once they are in.

**Assessment.** Functions that measure or document student learning and the effectiveness of learning materials to support student learning.

**Cognitive Supports and Organizational Tools:** Functions that support cognitive processes, reduce cognitive load of the learner, extend the cognitive capabilities of the learner or allow the learner to test ideas within problem solving contexts, and provide support for organizing one’s work.

**Collaboration/Communication Tools:** Functions that support peer interaction, either in discussion or group work. (includes project/team management functionality).

**User Interface:** Design and ease-of-use functionality of screens, particular to each type of user.

**Content Creation and Delivery:** Functions that facilitate and support the sharing of resources and other content, generated and/or provided by faculty AND students.

**Instructional/Learning Design Support:** How CMS supports the incorporation of pedagogy, andragogy, and learner needs and preferences in course design.

**Integration and Interoperability:** Extent to which functions within one platform or system are integrated with each other, extent to which functions within one platform or system can operate across multiple courses; extent to which functions can operate between systems or platforms and between different institutions.

**Policy and Organizational Issues:** Current policies and organizational issues that are barriers to the use of course management systems to support deeper learning.

**Standards/Specifications:** Technical specifications or standards, e.g. IMS or other standards.

### 5.2 Table 1: CMS Problems and Issues

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<th>Access Control</th>
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<tr>
<td>• Current systems access controls don’t support team course development or teaching.</td>
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<td>• Need to deal with organizational issues around CMSs, e.g., IP issues with use of controlled IP, moving between institutions.</td>
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<td>• Many CMS only allow current course participants access to the course (may want to go back and refer to resources from a course previously taken).</td>
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<td>• Teacher-centric orientation is reflected in not providing for student access to collaboration tools themselves to use features that exist in CMS.</td>
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<td>• When you close a window by mistake, need to log in all over again.</td>
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<tr>
<th>Assessment</th>
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<td>• Current assessment is limited primarily to tools for instructors to assess student learning, e.g., the ability to create programmed quizzes or tests that are generally true/false, multiple choice, matching, ordering, or fill-in-the-blank</td>
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<tr>
<td>• Most course management systems integrate assessment tools that are objectivist in nature.</td>
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</table>
| Cognitive Supports and Organizational Tools | • Calendaring functions (“work-to-do” tracking) are too limited – only list part of task, only organize tasks by course (not by person, so students have to go through all their courses individually to get full “to-do” list)  
• Some tools are designed with an assumption that the user will intuitively understand how to use them. |
| --- | --- |
| Collaboration/Communication | • Group discussions require ‘group definition’ for each topic item  
• Chat features are simplistic, requiring instructor ownership of logs rather than student management and ownership.  
• Students cannot use collaboration tools themselves to use features that exist in CMS. |
| Content Creation & Delivery | • In practice, many faculty use CMS as a one-way broadcast medium.  
• Limited multimedia capabilities limit the form of the content.  
• Downloading and uploading files is time consuming. Remembering to use “track changes” in versions submitted online limits utility of online submission of assignments. |
| Instructional/Learning Design Support | • CMSs are more teacher-centered than learner-centered.  
• CMSs are course-centric, not learner-centered.  
• Instructional design tools that could be incorporated into CMS (e.g. Designer’s Edge®) are very good, but too complicated for faculty.  
• Conflicts between content/instructional design and the technological tools.  
• Proliferation of collaborative/communication strategies, but successful collaborative work has to do with structuring of the groups, the tasks that groups are given, and the group skills of participants. CMSs have limited support structures, scaffolding, and rubric creation for peer work and most does not reflect what is known about successful group work.  
• Faculty find it difficult to design, then apply design to the tools. Instead, they take the tools and make their course fit the tool. Means more support is needed to help faculty figure out how they can offer their material in the CMS framework.  
• As semester goes on, students use fewer functions and don’t go as deeply into course materials because of time constraints. Students particularly complain about going to separate spaces in CMS.  
• Students can be overwhelmed by out of class assignments and then begin to take the expeditious approach.  
• CMS permits one instructor to give weekly assessments and omit mid-term and final exams.  
• Too much one size fits all design.  
• Some learners don’t like to work in groups.  
• Need to address culture specifically; is often overlooked for institutions that serve culturally diverse populations, such as the need for multi-language support that supports cultural contexts of learners.  
• Not easy to see big picture: how course is situated in curriculum/program with content/objectives that are pre-determined) Don’t get to see structure. |
| Policy/Organizational Issues | • Lack of willingness of many faculty to use CMS  
• High cost, both in terms of software license and resource personnel to support CMS. |
<table>
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<tr>
<th>Standards/ Specification</th>
<th>• Difficult to integrate of non-proprietary objects and locally developed modules into CMSs.</th>
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<tbody>
<tr>
<td>User Interface</td>
<td>• All configurability lies with faculty; none of configurability lies with students. &lt;br&gt;• Template-based CMS constrains expert users. &lt;br&gt;• Whether default is “on” or “off” for features can matter in use of functions. &lt;br&gt;• Tools assume students know what they should do.</td>
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### 5.3 Table 2: CMS Recommendations

| Access controls | • Enable students to add to the content of the course and be course co-authors; students should be able to create threads, make announcements, etc. (if faculty choose to give permissions) <br>• Need authentication and authorization infrastructure that allows for co-designers, e.g. team teaching (including inter-institutional teams); support for multiple sections + instructors – collaboration is the norm, not the exception. <br>• Functionality that provides a “common space” that multiple courses could share, where re-usable resources could be accessed; get sharing of learning objects, and economies of scale <br>• Granularity and flexibility of roles and privileges (for all “modules/tools”) <br>• Provide function so that student work can be accessed/displayed in public places to serve as models for other students. <br>• Provide different levels of design template/interface/process for different needs of novice and advanced faculty user. <br>• When you close a window by mistake, need to log in all over again; this should be simplified. <br>• Give advisor access to student profile within a course and across courses, i.e. permissions, multiple levels of access, exportable to advisor database. <br>• Give students access to courses they have already completed, but are not necessarily currently enrolled in (to repeat assignments, etc. based on self-assessment in next course in series). |
Assessment

- Provide assessment tools that evaluate effectiveness of learning materials/assignments/tests (can be used for indirect faculty development).
- Provide more assessment instruments that provide ongoing and just-in-time feedback.
- Provide ability for students to track their learning and development over time, not just within course framework (e.g., development of critical thinking skills).
- Support rubrics for faculty that model how evaluation and assessment should be structured in multiple learning environments.
- Use tracking databases to structure what next steps for a learner might be (or what next lecture should emphasize).
- Develop layers of reporting tools: need to be able to report back on effectiveness of material/assignments/exercises (not just student assessment).
- Evaluation of courses built-in to the CMS (rather than having to do separate evaluation process).
- Tools (or wizard templates) for assessing quality of course design according to different learning theories or principles.
- Better and more holistic ways to establish metrics on student participation.
- Tool that records student verification of having covered X material so that they must stop at a certain point and affirm they’ve reached point X before continuing. Tool where faculty member fills out the steps, student affirms. Affirmation is recorded. (Accountability tool.)
- Function that provides qualitative assessment, such as student participation in different areas and threads of participation over time.
- Functionality that informs learners what (statistically) it takes to be successful.
- Student logs, products are attached to student rather than course, e.g., convert papers into Web sites, e.g. student portfolio; peer reviews.
- Need functions built into tools so students can do self-assessment, and then choose to go back to a previously taken course for review of resources and ideas.
- Ability to tie all course elements back to learning objectives (and embed assessment in all content objects)
- Competency quiz for students before taking CMS-based course. Are they the right temperament? Do they have the necessary skills?
- Embed assessment within content objects.
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<th>Cognitive Supports/ Organizational Tools</th>
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<td>• Intelligent agents that perform repeated tasks (monitor student activities, handling e-mail messages) and provide other information needs to go to the student and instructor so they only have to go to one place (Need pattern recognition. If student X always uses a particular path, the system should recognize it and take student to preferred spot).</td>
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<td>• Methodology and course flow needs to be visible to students (meta-cognitive aspects of course); pop-ups to provide information as needed, that helps students situate their position in the narrative and flow of the course</td>
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<td>• Integration of support services for under-prepared students (tailoring to individual students)</td>
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<td>• Calendaring functions (work-to-do place) need to see at a glance with optional pop-up; multiple assignments; student calendar that has everything on it that pertains to all their courses and all their personal interests as well; friends can schedule; or download easily to PDA; have students able to put “to-dos”/sticky notes; OPTIONS on how they want to be alerted (linked to e-mail; advance notice with link back to course web site; mobile learner problem; print out.</td>
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<td>• Research poster tool that models research and does not require technical skills supporting real world practice and application.</td>
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<td>• Need to provide infrastructure to help students to learn how to be online learners.</td>
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<td>Collaboration/Communication</td>
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<td>• Discussion tools should incorporate what is known about discussion, communication and collaboration.</td>
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<td>• Option to set up threaded listservs that are password-protected and that can be broken up into subtopics with levels of access control</td>
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<td>• Include collaboration tools for students that include: shared space, more power (if faculty chooses) for student to create threads, make announcements, etc</td>
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<td>• Function that documents history for group projects.</td>
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<td>• Function that documents management of group projects</td>
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<td>• Plug-ins that encourage group learning.</td>
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<td>• Allow for collaborative assignments that can be entered into grade book.</td>
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<td>• Function that permits students to log chat transcripts for own use</td>
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<td>• Function that permits inclusion of web-based media into chat forum for all of group to see</td>
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<td>• Ability to set number of small chat groups, rather than a standard “4”</td>
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<td>• Ability for instructor to simultaneously “listen in” on multiple chat groups without having to be “in the group”</td>
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### Content Creation/Delivery

- Build in a feature that prompts a user about copyright permissions and/or a feature that interacts with a copyright service.
- Faculty can choose references/resources that lets them create their own html pages.
- Function that allows faculty member to push first contact with material outside of course/learning activity (e.g., ability to get content to students through push mechanisms)
- Have to be able to include audio/visual/graphic content (not be forced to link to something somewhere else.
- Need journaling functions that have linkages between commentary/communication/journaling and resources (sometimes the “content” is embedded in the connections/relationships).
- Tools that allow more complex attachments within the CMS.
- Blogging tools would enable student choice.
- Learning objects must be re-useable and interoperable between systems courses .cross platform/system, movement of records, artifacts.
- Integrated learning objects repository – across institutions and courses – need to be able to interact with CMSs.
- Incorporate ePortfolio model that is exportable so that the student can take it away with them (including informal artifacts, such as journals).
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<th>Instructional/ Learning Design Support</th>
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<td>• Pedagogical advisement layer. CMS could have an upfront questionnaire whose results would be used to help guide faculty to use CMS. Questionnaire could include basic questions like number of students, whether hybrid or totally online course. A possible model might be similar to tax preparation programs that give advice. It is critical to identify where the content of the pedagogy tool would come from – the companies, the institution, pedagogical experts? (CMS “course in a box” structure that guides faculty in how much time, process, pieces (ordered) would help them get course mounted in the CMS). Provide sample courses, modules, etc. through a system function that can make suggestions about content and navigation as faculty design course.</td>
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<td>• Functions that support different learning needs and preferences (e.g., for learning module, student specifies preferred media – e.g., video – and system pulls up the appropriate learning object at the appropriate time).</td>
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<td>• Embed new and wide-ranging instructional design principles into tools (e.g., support integrated wizard templates that can be created locally by learning designers and others) to support and reeducate faculty.</td>
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<td>• Make instructional design tools within CMSs modularized to make their complexity flexible.</td>
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<td>• Need to be able to match structure of navigation to align with teaching practices/learning activities.</td>
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<td>• Provide functions to support learning activities (or plug-ins) that are specific to disciplines, e.g. science lab, art, writing, etc.</td>
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<td>• Design with offline tools that structures rather than with cumbersome embedded tools.</td>
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<td>• Provide way for faculty in hybrid courses to duplicate what they do in face-to-face and online environment.</td>
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<td>• Provide enough structure in the CMS interface and function design so new faculty can use successfully but not constrain innovations. Ability to turn features on and off and to break out of a shell.</td>
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<td>• Eliminate silos of courses (course content is based on higher order decisions, courses live within a curriculum; blueprint for course in program with content/objectives that are pre-determined – make all of this visible).</td>
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<td>• Opportunity for faculty to see the curriculum of other classes to see how they are dealing with/delivering a particular learning objective (could integrate into a whole; make plans at a completely different level, thinking of course and citizen in a community of courses); deals with prerequisites; would like to integrate with curriculum of prerequisites (and navigate back into that site); might be more likely to do more experimentation.</td>
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<td>• Locations, activities, functions, resources tied to learning objectives (can follow the numbers back).</td>
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<td>• Need a way for learners to take control of the content, even if highly structured.</td>
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<td>• Giving learners choices (already removed same time/same place).</td>
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<td>• Provide multiple paths of learning for different learning styles, so that as a learner moves through explanation of concepts - through text, pictures, animations – learner can track path and receive feedback.</td>
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<td>• Provide for collaboration between faculty and designers.</td>
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<td>• Incorporate strategies for rich discussion and commentary within the framework.</td>
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<td>• Provide functions that can accommodate learner as the individual and learners as a group so that there is flexibility in what learners learn but also a structured format that encourages fast learners to contribute to community. Should not just allow fast learners to jump ahead since they should contribute to the group.</td>
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<td>Integration and Interoperability</td>
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<tr>
<td>• Support for data acquisition tools and protocols would be a good addition for accessing 'real world problems', (e.g. interface with PDAs)</td>
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<td>• Decentralization of functionalities rather than centralized.</td>
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<td>• Open hooks for support with third party tools and legacy systems.</td>
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<td>• Provide interoperability with external systems that document student progress, e.g. grade reports, advising.</td>
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<th>Standards/ Specifications</th>
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<td>• Meta-tagging of content can show where there is overlap and duplication, cross-link, and check if gone through the right objective-coded content.</td>
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<td>• Meta-tagging prompts.</td>
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<th>Policy/ Organizational Changes</th>
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<td>• Institutional consortia for broader support system and leadership.</td>
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<td>• Budget for software upgrade; support personnel; instructional design expert teams; programming-applications support; (tied to number of student users?).</td>
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<td>• Inter-Institutional display and access of ‘best practices’ in CMS examples.</td>
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<td>• Discipline specific survey of needs and desires in establishing deep learning practices within CMS technology.</td>
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<td>• Examination of team structure and location housing CMS support structure.</td>
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<td>User Interface &amp; Navigation</td>
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<tr>
<td>• Need more transparent ways of moving around in the course spaces.</td>
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<td>• Need more push technology based on student learning style and preference.</td>
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<td>• Better for default to be “on” in order to promote use of functions.</td>
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<td>• More navigation aids.</td>
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<td>• Hot keys that allow you to do multi-functions quickly instead of using web forms for that purpose.</td>
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<td>• Don’t want to become Microsoft Word with so much functionality that is never used and that is seen as getting in the way.</td>
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<tr>
<td>• Toolbar or other support to include easy incorporation of exterior-to-CMS sources (i.e. Excel spreadsheets; .pdf resources; library searches, so student can quickly move across programs).</td>
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6.0 General Session: Creating Principle-Based Learning Environments with Course Management Systems (See presenters’ PowerPoint presentations at http://www.educause.edu/asp/doclib/abstract.asp?ID=NL0330)

Focusing Questions:

Nada Dabbagh (Assistant Professor Instructional Design and Development, George Mason University, Graduate School of Education)
- What are good learner-centered instructional strategies (teaching practices and learning activities) and examples of their implementation in course management systems?
- How are teaching practices and learning activities conceptually related?
- What are some theory-based design implications for online learning based on the principles of deep learning?
- What features of course management systems support the implementation of learner-centered practices?
- What are some pedagogical limitations of CMSs?

Van Weigel, Professor of Ethics and Economic Development, Eastern University
- Assuming the use of good learning design (learning-centered teaching practices and learning activities), what does learning management software need to be able to help teachers and learners do?
- What are some suggested capabilities for next generation course management systems?

6.1 The Intersection and Alignment of Learner-Centered Instructional Strategies in Online Learning and their Implementation Using Course Management Systems (Nada Dabbagh)


1. **How are teaching practices and learning activities conceptually related?**
   - Teaching practices = instructional strategies
   - Instructional strategies are what instructors or instructional systems do to facilitate student learning
   - Examples of instructional strategies:
     - Providing collaboration
     - Providing feedback
     - Providing advanced organizers
     - Sequencing instruction
     - Recalling prerequisite knowledge

2. **What are some theory-based design implications for online learning based on the principles of deep learning?**
• Using the Deeper Learning Principles suggested by Carmean, learning requires: ownership, encourages engagement, is an active and social process, and is contextual/situated.

• Theory-based Design Framework

Learning activities are designed using instructional strategies, which are based on pedagogical models, which are derived from learning theory, which is understood based on beliefs about how people learn. Learning technologies support the instructional strategies.

• Three components of online learning model:
  o Pedagogical models (e.g., open, flexible learning; distributed learning; situated learning; communities of practice/knowledge-building communities)
  o Instructional strategies
    ▪ collaboration
    ▪ social negotiation
    ▪ exploration
    ▪ articulation
    ▪ reflection
    ▪ role-playing
    ▪ problem solving
  o Learning technologies support the instructional strategies (e.g., asynchronous communication tools, hypermedia/multimedia, web, groupware, video conferencing, and course management systems)

• Hierarchical intersection and lateral alignment of instructional strategies:

  Promote authentic learning activities
  Exploratory – Dialogical -- Supportive
  Promote self-directed learning

• Design to promote:
  o authentic learning (e.g., real-world relevance, ill-defined and complex, multiple domains, skills and levels of expertise, over sustained period of time, with diversity of learning outcomes).
  o exploratory-type strategies (e.g., problem-solving, hypotheses generation, role-playing).
  o dialogical strategies (e.g., articulation, reflection, collaboration).
  o learner guidance (e.g., scaffolding, modeling, coaching).
  o self-directed learning (meta-cognition).

3. What features of learning technologies support these learner-centered Instructional Strategies?

• Mapping learner-centered instructional strategies to Web features
  See http://mason.gmu.edu/~ndabbagh/wblg/matrix1.htm
4. **What are some pedagogical limitations of current course management systems?**

- In addition to lack of authentic assessment mentioned already, current course management systems: Are oriented toward administrative productivity and in practice tend to compromise sound pedagogy.
- Emphasize faculty content dissemination over student learning.
- Lack flexibility to support learner-centered design (group-based learning, multiple forms of knowledge representation).

**However, if faculty and course designers take the time to redesign their existing courses when using CMS, through a comprehensive examination of their features and the careful integration of the learning activities afforded by these features, much of the replication of traditional face-to-face classroom instruction can be avoided and instructional designs that are learner-centered will emerge.**

(NOTE: Dr. Dabbagh’s references and resources are listed in her presentation, and have been added to the key themes page on “Learner-Centered Practices,” see [http://www.educause.edu/nlii/keythemes/learnercentered.asp](http://www.educause.edu/nlii/keythemes/learnercentered.asp))

6.2 **Deeper Learning and CMS (Van Weigel)**

Many of Dr. Weigel’s insights are also included in his book, “Deep Learning for a Digital Age,” (Jossey-Bass, October 2001) and on his web site describing his Knowledge Room concept. ([http://www.knowledgeroom.com](http://www.knowledgeroom.com)).

Dr. Weigel tackled the following questions:

5. **Assuming the use of good learning design (learning-centered teaching practices and learning activities), what does learning management software need to be able to help teachers and learners do?**

6. **What are some suggested capabilities for next generation course management systems?**

Next generation course management systems will:

<table>
<thead>
<tr>
<th>Learning as Discovery</th>
<th>v. Conventional Sense of Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surprising and unpredictable experience</td>
<td>Mappable and programmable</td>
</tr>
</tbody>
</table>
Expression of curiosity | Objective-laden experience
---|---
Comes from grappling with ill-defined problems (students at ease with failure) | Follows well-trod paths

- **Be an “out-of-course” experience (the container no longer the course).**

<table>
<thead>
<tr>
<th>Learning as out of course experience</th>
<th>Learning as in course experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep learning results in conditionalized knowledge (contextually useful)</td>
<td>Textbook application of knowledge</td>
</tr>
<tr>
<td>Learning is an interdisciplinary endeavor</td>
<td>Knowledge is segmented</td>
</tr>
<tr>
<td>ePortfolios track and support learners’ development across entire learning career</td>
<td>Grades and credits are only measure of learning career</td>
</tr>
<tr>
<td>Community educators provide assessment services</td>
<td>Teachers give grades</td>
</tr>
</tbody>
</table>

- **Emphasize skill development in knowledge management based on the emerging continuum from capture to connectivity** (for more on knowledge management, see “Data Smog: Surviving the Information Glut,” by David Shenk, Revised and Updated edition Harper San Francisco; (June 1998)
  - Discernment as core Information Age skill.
  - Tacit knowledge mined through “peer assists.”
  - Students build knowledge objects that are useful to others.
- **Empower students to be educators** (Resource: “Smart Mobs,” Howard Rheingold, Perseus Publishing; (October 2002)
  - Learning-centered practices require considerably higher time expenditures and availability of educators.
  - Use technology as tool for interactivity and connection.
  - Use technology as a tool for profound decentralization.
  - Teach to learn as a core pedagogical approach: organization, articulation, reflection, re-organization.

What are the implications for next generation course management systems?

Next generation course management systems will support:

- Student-to-student collaboration in tackling large and ill-defined problems (support and develop peer-to-peer interactions and assists).
- Learning logs for metacognitive development (how do I succeed or fail).
- Border experiences – intercultural, intergenerational, interdisciplinary.
- Learning career e-portfolios as a necessary pedagogical tool.
- Retrospective reflection on how knowledge extends grasp of previous understandings and problem-solving approaches.
- Student practice in competently assessing their own work in the presence of others.
- Broadest interpretation and understanding of faculty resources.
- Student development of “knowledge assets” that will be useful to others (e.g., turning papers into web sites).
7.0 General Group Discussion

Small groups made a first pass at general categories for functional requirements for next generation CMS.

8.0 CMS Parlor

After lunch, faculty, staff, and vendor representatives demonstrated how currently available CMSs are being used in an actual course to promote deeper learning. At 15-20 minute intervals, attendees were able to move from station to station. The CMSs and presenters featured as part of the parlor included:

**ANGEL**
http://www.cyberlearninglabs.com/
David Mills, Vice President, CyberLearning Labs
dmills@cyberlearninglabs.com

**Blackboard**
http://www.blackboard.com
Kathleen Bennett, Web Instructional Technologist, The University of Tennessee
kbennett@utk.edu

**Desire2Learn**
Jennifer Franklin, Instructional Dvlp & Assessment Specialist, University of Arizona
jennyfra@email.arizona.edu

**EDUTOOLS/Multiple Site Station**
http://www.edutools.info/course/index.jsp
Jackie Dobrovolny, Researcher, WICHE/WCET
jdoffice@attbi.com

**Chef Project**: http://www.chefproject.org/index.htm

**Learn Exact**: http://www.learnexact.com

**Silicon Chalk**: http://www.silicon-chalk.com/

**Bazaar Online**: Conference System: http://klaatu.pc.athabascau.ca/cgi-bin/b7/main.pl?rid=1

**POLIS**
http://www.u.arizona.edu/ic/polis/
Veronica Diaz, University of Arizona
vdiaz@u.arizona.edu
Duffy Gillman, University of Arizona
gillmand@u.library.arizona.edu

**The Associate Fellowship in Integrative Medicine**
http://integrativemedicine.arizona.edu/af/index.html
Sue South, University of Arizona
ses@ahsc.arizona.edu
John King, University of Arizona
johnk@email.arizona.edu
WebCT
Dale Voorhees, Coordinator of Course Development, University of Central Florida
dvoorhee@mail.ucf.edu
Dan Volchok, Senior Manager, User Community Relations, WebCT
Dan.Volchok@webct.com

Course Demos:
http://reach.ucf.edu/~lin4680
http://reach.ucf.edu/~comp1

Login access:
username:  webct
password:  dryd0ck (with a zero)

WebCT/Old Pueblo MOO
http://www.webct.com/
http://oldpueblomoo.arizona.edu
Marty Hewlett, Professor, Molecular Biology, University of Arizona
hewlett@u.arizona.edu

9.0 Panel Discussion: Designing Next Generation Course Management Systems

Moderator: Colleen Carmean, IT Director, Consulting, Arizona State University West

Presenters: Barbara Ross, Chief Operating Officer, WebCT
Matthew Pittinsky, Chairman, Blackboard Inc.
Ali Jafari, Professor of Computer Technology and Director of CyberLab, Indiana
University-Purdue University Indianapolis

Panelists representing three leading course management system development projects tackled the following questions, addressing one critical aspect of next generation course management systems (learning objects, third-party tools, and next-generation users) as they did so:

1. What are the forces driving the development of future software and systems in this arena?
2. What are some examples of future development projects where design will reflect principles?
3. What forces (policy, digital rights management, faculty development) will influence effective development and implementation?
4. How can the Higher Education user community most effectively communicate its requirements for future principle-based software and systems?

Pre-Meeting readings suggested by these presenters included:

“The Evolving Role of Course Management System Providers in the Transformation of Education: An Interview with Blackboard’s Matthew Pittinsky,”

9.1 Learning Objects

Barbara Ross’s presentation focused on the role of learning objects in next generation systems. She argued that:

1. Learning objects will matter.
   a. Working definition of learning object: a piece of content (text, media, image) of any size, with a wrapper around it that includes learning objectives and outcomes assessments (and that is smaller than a course).
   b. Learning objects can provide feedback to content owner about what’s being used, why used, if working, value.
   c. The concept of learning objects is taking hold in higher education.
   d. Learning object work is being funded (54 NSF grants, 547 FIPSE grants).
   e. Applicable standards are emerging (XML, IMS, SCORM).
   f. National organizations such as the NLII have begun to focus on them (NLII 2003 Fall Focus Session).

   National standards need to form to facilitate integration of repositories with CMSs and to make learning objects portable.

2. A commerce model needs to emerge (and commercial publishers must enter the space).
   a. Use and production depends on a critical mass.
   b. Early funded university projects can’t persist (same thing happened in course management area).
   c. The initial commerce model may flow through the library.

3. The primary delivery system of learning objects to students will be linear descendents of the original CMSs
   a. 70-85% standardization by institutions.
   b. Use of CMS to authenticate into licensed learning materials, such as e-reserves, library-based reading lists.
   c. CMSs have been more successful in delivering digital content than other means (e.g. e-books).

9.2 Third-Party Tools

Matthew Pittinsky spoke about the future of CMSs as platforms integrating third-party tools, rather than as do-everything-for-everyone applications. Because educational practice is boundless in terms of pedagogical and disciplinary styles, one size of educational software does not fit all. However, CMSs can serve as an “operating system” which provides core services to and organizes communications among tools, some developed by the CMS vendor and some by third parties. Next generation CMSs will provide five types of services:

1. Enable tools to invoke other tools for use.
   a. Tools will be aware of other tools.
   b. CMSs will be built with standard generic tools (e.g., gradebook), but will be configurable to use custom tools (locally-developed gradebook).

2. Handle session management and user tracking for multiple tools.

3. As difference between content and tools blurs (e.g., virtual biology lab), act as broker for the tools and the content to ensure interoperability of content.

4. Make available directory services for resources, both content and tools.

5. Streamline access to IP licensing services (provide core infrastructure to support commercial marketplace of publishers).

9.3 Next-Generation Course Management System Users
Ali Jafari posited three key directions for next generation CMS development.

1. Next generation course management systems will reflect the needs of next generation course management system users. Current CMS require repetitive, time-consuming activities; many more tools and activities will only be possible through delegation. Therefore, next generation CMSs should be “smart” and include intelligent agents that identify repetitive, time-consuming tasks and automate them.

2. Future users of CMSs are likely to become “advanced” users, unsatisfied with the template with business logic encoded in the software itself. They will want more control over the environment, in order to change the business logic according to their teaching and/or learning style. Therefore, next generation CMSs need to provide “intelligent user interface and navigation” that gives users the ability to modify navigation and the user interface.

3. Other educational software (e.g., e-portfolios) will be emerging, and these need to be integrated into one system. Need more than the current middleware. (authorization/authentication as middleware infrastructure), need common source for other applications. For example, has access to 5 different file access sysytems – should have only one file manager that is used by all the applications.

10.0 Small Group Discussions

Throughout the day, participants identified problems which that inhibit the use of CMSs to promote deep learning and the next-generation CMS features, functionality, and policy improvements, which would address those problems. These were collected, and participants met in groups to discuss and prioritize the suggestions. Four groups met and discussed: teaching and learning issues, technology and architectural issues, management and system issues, and the NLII CMS Observation Tool and Glossary.

11.0 Wrap-up: Prioritized Lists of Features

In the final session, the small groups reported out to the general session their prioritized lists.

The technology group identified these features are most important:

1. Integration and extensibility: Next generation CMSs should make it easy to interoperate with email, student information, and other administrative computing systems, to integrate third-party tools such as electronic portfolio systems and digital library clients, and to build custom tools which access the core services of the CMS.

2. Intelligent agents: The system should recognize and automate repeated tasks to help learners and teachers become more efficient.

3. Digital rights management: Student work should be student owned: Students should be able to control access to their work, export it to other systems, and download it in a form that captures its context to be reusable elsewhere.

4. Multiple Levels of Authoring Interface complexity: New users should be provided with templates and other scaffolding to make it easy for them to author pedagogically-sound course content and structure. Advanced authors should be able access and modify the business logic and user interface in more sophisticated ways (possibly using desktop, as well as web-based tools) in order to accommodate pedagogies such as problem-based learning.

5. Content Interoperability: Learning objects and other interactive content objects should be able plug into multiple applications.

There were two teaching and learning groups. The first identified these features as most important:

1. Cross-course functionality: Students and teachers should be able to share content across courses and share tools and spaces across courses.
2. **Peer interaction:** New and better tools should be developed to support peer feedback, evaluation, group work, and exchange of resources.

3. **Learning tools and student wizards:** The CMS should use AI techniques to customize the learning experience by offering suggestions and content based on a student’s use of the system.

4. **Faculty pedagogy advising:** The system should use agents and wizards to help faculty create courses which promote deep learning and provide flexible content to address the diverse needs of learners. (Locally-developed wizards should also be supported).

5. **Persistence and portability:** Students and teachers need access to courses and artifacts across systems and beyond to time boundaries of a particular course in order to extend learning over time.

The second teaching and learning group found these features most important:

1. **Course is no longer the container:** Move away from the course-container: It must be easier to make strong connections to materials and to facilitate interaction across courses.

2. **Collaboration tools:** More features that empower students to collaborate with each other and to co-teach with the instructor.

3. **Blogging and journaling tools:** Integrate tools for public and private journaling and reflection with the integrated mechanisms for peers and teachers to respond.

4. **Equation editing:** Better support mathematical notation systems.

5. **Access:** Increase the content authoring capabilities for all types of users.

6. **Annotation tools:** Students can annotate documents, add associated reflections to a document over time, and control access to their comments.

The institutional group identified these issues are most crucial to address:

1. **Organizational structure and institutional structures:** CMS success is dependent on alignment of institutional structures and processes. This alignment requires a clear institutional vision, which leads to clear statements about how the institution will report, reward, and support technology products and services development. These policies should balance a hierarchy for efficiency and autonomy to encourage innovation. The CMS must accommodate this balance across organizational models and departments.

2. **Copyright issues:** Standards for copyright are needed and should address the use of student work for assessment. We need to think about moving beyond ownership and controlling access to more open licensing policies.

3. **Consortia:** The model of the all-encompassing and self-enclosed higher education institution is insufficient to support diverse populations. Institutions need to find new ways to work together.

### 12.0 Work Products Completed and Next Steps

- Refine the conceptual framework (see [http://www.educause.edu/nlili/keythemes/lcp/](http://www.educause.edu/nlili/keythemes/lcp/)) that was designed to provide common framework so diverse participants can have productive dialogues about the use of technology. Final draft due Fall Quarter, 2003.

- Glossary of terms (see updated glossary at [http://educ3.utsa.edu/pmcgee/nlili/NLII_glo.rtf](http://educ3.utsa.edu/pmcgee/nlili/NLII_glo.rtf)), purpose of which is again, to facilitate productive dialogues about the use of technology, in particular course management systems. Final draft due Fall Quarter, 2003.

- Principles Observation Tool (see updated version at [http://educ3.utsa.edu/pmcgee/nlili/CMS_V2.htm](http://educ3.utsa.edu/pmcgee/nlili/CMS_V2.htm)), designed to help an observer be reflective about deeper learning principles in the context of an actual course supported by a course management system. Final draft due Summer, 2003.
- Prioritized set of issues and recommendations associated with features of next-generation CMSs according to learner-centered principles. (First draft currently in meeting notes, but list to be extracted and refined into a separate work product to be shared with CMS developers Summer, 2003).
- Usage scenarios representing features recommended by focus session participants, to be provided to IMS working groups for their use in developing technical specifications. To be developed April – May, 2003.
- Final draft, consensual set of functional requirements for next generation course management systems, to be provided to IMS working groups and course management software developers: To be developed May - July, 2003.
- Course Management Systems working group was chartered as a consequence of the focus session and will operate from April, 2003 through January 2004. In general the role of this working group is to: review the final draft versions of the working documents described above; tackle institutional and organizational issues and recommendations including consortial approaches) regarding the effective implementation and support of course management systems; and strategize how to approach and work with decision-makers who choose and manage course management systems so that teaching and learning issues are understood, recognized, and included in the decision-making process. Co-leaders of the working group are:
  - Ron Bleed, Maricopa Community College
  - Malcolm Brown, Dartmouth College
  - Jean Kreis, University of Arizona