

A Research Study on Current CMS and Next Generation eLearning Environment

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Introduction

In 2005, the authors undertook a research study of Learning/Course Management Systems (L/CMS) stakeholder expectations in a select number of higher education institutions for the next generation of teaching and learning technology (see note 1). The project focused on the framework of the currently popular L/CMS and asked instructors, students and administrators about their observations and experiences with the current system brands and then asked them to imagine what the next generation of teaching and learning technology should look like. Using a qualitative case study method, researchers traveled to seven institutions in the United States for one to two days per site to gather data and analyze common threads and themes (see note 2). What they found won't surprise those who use, purchase, or manage L/CMS: stakeholders are waiting for a learning environment that is "smart," environmental, archival, multi-modal, and mobile. Is that too much to ask? This paper consists of four sections. The initial section offers brief report and interpretations of the collected data followed by the personal reflections of each investigator, based on their findings regarding the Next Generation eLearning Environment.

Background

There is much we know about Learning/Course Management Systems (hereafter referred to as L/CMS) and their presence in higher education. This rose, by any name, has burst onto the landscape of higher education teaching and learning, blooming within 94% of higher education campuses (Education Marketer, 2003), and it is imperative that careful reflection on the further development and implementation of technology-mediated teaching and learning consider the needs, successes, and preferences of those who use and manage these tools. The authors explored the topic in an edited book on current L/CMS design and usage (McGee, Carmean & Jafari, 2005). In this work we documented effective practices in terms of archiving and accessing content, engaging and supporting faculty impact on curriculum, and engaging the learner. The book also examined standards and specifications, perceptions of value and viability, instructional design and practice, and adaptation and accommodations. This project opened questions of what the next system could, should, and would look like. After the publication of the book, Dr. Ali Jafari took a one year sabbatical research leave to explore next generation needs and possibilities and specifications for next generation L/CMS systems, hereafter referred to as the Next Generation of eLearning Environment. Drs. Carmean and McGee joined Jafari

with the intent to meet with various focus groups within the L/CMS use community to gain comprehensive perspectives on both positive and negative features of the current L/CMS technology and to brainstorm, collect and document new ideas for the successful future development of the Next Generation of eLearning Environment. In order to accomplish a truly comprehensive picture, we interviewed 59 instructors, 52 students, and 51 IT/academic leaders, IT administrators, and IT service providers.

Study Design

A qualitative case study design allowed the investigators to examine stakeholder beliefs, perceptions, and reported use of L/CMS without hypothesizing (Yin, 1993). Each of the authors had pre-conceived ideas about the usefulness of L/CMS and by using a case study approach, were less likely to impose their own beliefs. Additionally, they each have different backgrounds, research interests and serve different roles within their own institution. This diversity of thought and experience allowed the team to look at data from unique perspectives, and question each other's notes, records and analysis of data. In this approach they were able to conduct a cross-case analysis through which patterns were identified and articulated (Jensen & Rodgers, 2001). The use of L/CMS in higher education represented an analysis based on a bounded case that is limited in scope and easy to identify parameters (Creswell, 1998).

Data collection protocols were identical for each campus visit. The researchers visited each of the campuses either all together or in teams of two. The research team met with focus groups on each campus asking three segmented research questions, supported by additional follow-up questions deemed appropriate for each specific community. Study participants were given a one-page survey that asked for demographic data and their responses to the three primary research questions, with spaces for reflections, to ensure that each voice was recorded. People interviewed in this project, hereafter referred to *stakeholders*, were included in one of the three primary groups: the students or learners group; the faculty, scientists, and librarians group; and the CIO, Provosts, and IT managers group. A select number of technology support and instructional designers were also included. The last group, the decision makers/administrators, was mostly conducted in one to one interviews. After visiting all of the campuses, each investigator reviewed the data and identified patterns. Then the three investigators compared the patterns they identified to illicit themes that articulate the concerns and needs that are captured in functions and features of systems necessary for researchers, L/CMS developers and higher education leaders to clearly understand diverse concerns regarding needs and expectations.

Research Questions

What stakeholders now value in the current L/CMS, and what is necessary in the Next Generation of eLearning Environment, are the key issues of this research project. To objectively gather data on these issues, a series of questions were asked in each of our interviews. From a baseline set of three questions, depending on the role of the stakeholder, questions were refined, rephrased or elaborated upon to provide better understanding of that constituent's needs. The baseline question set included:

1. What do you see as the top three advantages of L/CMS?
2. What do you see as the top three shortcomings of L/CMS?
3. What do you see as the top three features that would be most useful in the Next Generation eLearning Environment?

Study findings are presented throughout the report in major themes that were identified throughout the data analysis process. First the usage and shortcomings of current L/CMS are explored and presented. Second, visions and expectations for the future learning system are presented. Throughout both sets of findings, they have identified the role for the respondents: institutional decision-maker, faculty member, or learner.

Current L/CMS

The stakeholder response to the state of the current L/CMS indicates a number of key areas that the majority of users felt lacking. In general, these included compatibility and interoperability, usability, "dumb" systems, and course in a box pedagogy.

Compatibility and Interoperability

Issues of compatibility and interoperability were key issues to decision-makers and students. For some decision-makers, open source was seen as a possible solution to cost saving and interoperability and to the local control of systems by some institutions, although most administrators were committed to a single "brand," as well as to the reliability and support implied in commercial, enterprise installations. A few administrators admitted to feeling pressure to embrace open source on principle, but some felt open source options available today might be neither reliable nor ready at the present. As one individual noted, "It's the Hail Mary philosophy – good in theory, but I'll have to pray that it works."

Integration with other systems was seen as a key issue and an early determinant in how an L/CMS was chosen in relation to the priorities of the institution. Integration issues continue to become even more significant as institutions move to portals, single-source authentication and "branding".

Administrative frustrations were expressed with the “still one system at a time” pace of integration and the experience that add-ons are “limited and problematic.” For example, a mid-west university placed value in considering what they referred to as the “entire experience of the learner”. They use several systems that are each well integrated into the institution: across programs and the student’s experience as they move through courses and departments. This has required that academic programs think deeply and carefully about a system’s use over the entire experience of the learner, not just at the course level.

Transportability, or the ability to move content between systems, was seen as a system necessity by decision makers at the institutional level, and a current weakness at the level of institutional data and at the level of the individual user. Moving content within or across a system (say courses, grades, or dynamic registration information) is advantageous but problems occur when moving from desktop to system. “Most challenging [when changing systems] was moving content from one system to another which had to be done manually – over 400 courses in various stages...one professional had 8000 audio files with questions associated all of which had to be manually relocated.” As in other perceived L/CMS weaknesses, administrators admit that it has not been a big enough problem to contribute to a switch from one system to another, but a number expressed willingness to purchase add-on services if they were sold by L/CMS vendors as addable features. An administrator said, “Offer me a solution for the L/CMS grade book to SIS solution. Tell me you’ve already created this solution for my L/CMS. You have the translator, you’ve already done it. I’ll buy that service.”

Browser incompatibility was a commonly reported problem and yet a problem that should be the easiest one to resolve, when standards are adopted and users are informed about what works best with the L/CMS. Because the browser is the second line of contact with an L/CMS (after the speed of Internet connection), it represents the first barrier to new or experienced users. The browser configuration also provides challenges for the course designer who must design with all browser idiosyncrasies in mind, therefore cutting into efficiency and effectiveness. Browser differences also made support and documentation an issue for faculty and learner support. Everyone wants a “platform indifferent solution.”

Not surprisingly, students were often frustrated with *authentication issues*, generally frustrated with the many user identifications and passwords that were required of them as well as the limited access to other learner resources from within an L/CMS-based course container. “We need sign-in to everything at once.”

Finally, integration of L/CMS with other campus services was a concern for decision-makers, and one of inconvenience for faculty and students. All

of the campuses visited used proprietary systems for their enterprise L/CMS and therefore customization was limited at best, since modifications to hosted systems were limited by the vendor. One administrator noted a fact that all agreed upon, that if the vendor “goes out of business, content would have to be moved, and we have limited tools to do this.” Faculty members were particularly concerned about other institutional services such as email, grading records, and portfolios. Access to library reserves, course material and related, course-required systems should all be within one login. Access to grades, financial aid, etc from the same interface would be “a more perfect world.”

Usability

Administrators believe that “transparency” and “ease of use” is a more important feature in an L/CMS than a rich, complex tool set. When faced with rich tools or a simple interface that digitally replicated the “sage on the stage” experience, the majority of institutions chose “what we know.” Decision-makers acknowledge that learning the User Interface (UI) to an extent that would allow for creative, reflective learning design is “not motivating for faculty” and system upgrades are approached cautiously because they require a learning curve due when the UI is altered. Innovative faculty members often ask for more tools, and then their colleagues complain that the interface has become too complicated as tools are added. A balance between usability and rich feature set seems difficult to achieve.

Tools provided within an L/CMS are not, in general, utilized to their fullest capacity. There were many reasons given for this phenomenon. The amount of time needed to learn, incorporate and use many of the features demands too much of both learner and instructor. Downloading assignments was the number one area of complaint for faculty in this regard: “file management is a manual process, moving from place to place is time consuming and not intuitive.”

Differences existed between the evaluation of faculty and of learners in regard to a less static interface. The need to change teaching style to incorporate collaborative tools is not rewarded by the institution, and new technologies for the L/CMS found less favor here than amongst learners and administrators. “Too many clicks” certainly puts faculty and students off from deeply exploring or incorporating many tools in the course experience. Some decision-makers believe that there is already more feature functionality than faculty understand or are capable of using with traditional teaching styles.

Faculty members primarily expressed a desire for easier to use functions that reduce time and effort on their part. The inability to move content between courses and sections of courses was listed as both a time

and effectiveness issue, in that it may limit more pedagogically sound use of the tools. Usability and intuitive start-up was high on faculty list of desirables. "Maybe it can't be made easier, but it shouldn't be made harder." For example, grading papers, entering grades and returning files were seen as barriers that do not exist in the traditional classroom but were enormously problematic in the L/CMS environment. Faculty admitted that learner response to the L/CMS environment often surprised them. Many expressed a new understanding and sometimes surprise at the attention and expectation of students regarding timely grades and feedback with an L/CMS tool. Learners posting and commenting to each other in the discussion area also came up as a time and teaching management issue for the faculty.

Reliability of systems and anytime support is a concern for all stakeholders. Administrators believe that system backups and archives were key concerns in the value of L/CMS and in the safety of the content that is generated and stored in a system.

Dumb Systems

Current L/CMS are rather "dumb" given that their limited "smartness" is limited to offering some alert messages and notification of most recent changes in the course environment. Decision-makers and students, not faculty, were most vocal that an L/CMS does not "ensure best practices". Many felt that "cookie cutter" courses do not support disciplinary needs, nor can the limited customization accommodate increasingly sophisticated learners as they become more expert in their content skills and knowledge. Students noted that L/CMS don't "necessarily improve teaching," but many noted the connection of unimaginative use of the interface by the faculty member creating the container material. Students were not sure what it would take to get the faculty to use the L/CMS for more than ease of teaching. Faculty realized the need to redesign the course to effectively use the L/CMS for more than course *management* and found it "difficult to glean information from all the different sources, e.g. discussions, chats, lectures, Power Points™, etc." available within the course shell framework. Standard features available in the container were often unused by the faculty (customizing the course shell, peer discussion, group settings, peer review, gradebook, timely announcements, digital assignments, etc.) despite learner interest.

Course in a Box

Current L/CMS are modeled after the traditional classroom, embraced by faculty as a promised "course management system" and despite the name shift to "learning management" are not learner-centered and limit individualization, choice and control by the learner. For the most part,

students cannot alter the way their L/CMS looks or is organized, nor can they create “spaces” for their materials or observations and they have no access to the creation of collaborative areas, chats, or discussions. Not only does this burden the faculty member dedicated to collaborative and independent learning environments, it forces a fixed, passive learning environment. Students generally cannot extract content from an individual course, nor can they manage content or their own work from multiple L/CMS courses. More importantly, students recognize the effect on faculty members, “Faculty get behind when course content is not easily transferred from one semester to the other.”

Next Generation of eLearning Environment

Beyond upgrades and integration, conversations regarding the next generation L/CMS suggest that what is desired is not an upgraded system but rather more diverse, and user controlled functions that are aggregated and connected by those who use them. Characteristics for the future include archives and storage, multi-modal options, “talk to me” social technologies, mobile computing, smartness, and environmental features.

Archives and Storage

Everyone in the university community desires more space and tools for archiving materials. Administrators want new and improved ways to migrate, transport, extract, compact, and backup course content and organization. IT managers said they need a “*permanent place to store files*” and it limits efficiency when support teams as well as instructors have to store files locally or on different, hard to access drives. Students want to be able to access and store content over the course of their degree work, to have access to material for all their courses in one location, and to have access to and from systems both within and external to the university. Students also want to be able to return to a former course and locate materials and resources that were useful to them. This requires that CMS versions remain available. Faculty members also would like to be able to access student participation in current and former courses.

Multi-modal/Multimedia Communication Channels

Given the increasingly sophistication of mobile technologies, there is a clear demand for more modes of communication. Choices for how information is communicated are clearly a priority for decision-makers, faculty members, and students. For example, some faculty members said that they want to easily record their voice: as a reply to an email, an explanation, or as a comment to a submitted assignment. Other faculty members wanted “pictures of students [to appear] every time they post [a

message].” The increased range of modalities not only addresses learning needs and preferences of the learner, it expands pedagogical capabilities, and increases engagement. Knowing what is possible and imagining ever more intelligent and aware systems creates a pressing dissatisfaction with the slow, cumbersome, bloated and static L/CMS, e.g., “I want a memory machine that puts everything I am thinking or need right into the experience. Let it reorganize my thoughts and patterns and clusters and ideas!”

Such access must involve more agency, more awareness, more “push” of information to wherever the learner is at any time, and more reasons to “pull” the user into the system when needed and for a relevant and meaningful purpose.

“Talk to Me!”

Faculty and students want more technology options built into the course experience: audio, video, easy to use IM and SMS tools. Integration of collaboration tools currently used by the next generation user (Skype™, AIM™, podcasts, etc.) were high on the list of desired features. Poorly implemented synchronous communication tools (whiteboard, chat, group surfing) were often mentioned as the reality of the current L/CMS and were not used by students. Rather than a clumsy chat feature, users spoke of the need for a visual, interactive space so people can see others and “the board”, as well as what others are doing.

Students expressed great attachment to currently free and popular communication technologies and spoke of their desire to see these tools in the course experience. One instructor spoke of bringing the classroom experience of connection online: “I wish we could see a picture and hear a voice.” Students agreed with the need for real-time connection. When “in the course,” they want to interact with other learners the way they now interact and communicate with their friends and colleagues, “We want to be able to see who else in the course. Just like IM. When someone comes on, let me know that they are there.”

Mobile Computing

Mobility is critical to some faculty members and even more to students. No one wants to have to log on to a campus-based system to complete or monitor course activities. Students talked often about a PDA-enabled Next Generation eLearning Environment, as well as better integration to the systems and email services they personally use on the go. They want to be able to use convenient, mobile technology anytime and

anywhere in the Next Generation eLearning Environment. For example, the smart system that knows a deadline is approaching could SMS¹ students who have not yet posted to remind them of how much time they have left. Another desire is an automated voice function that provides notice or feedback about an assessment on request or on entry of the learner's grades.

Incorporation of current next generation learner tools like Flickr™, Facebook™, MySpace™, de.lic.ious, wikis and external mail services is an attractive feature in learning environments. For students, access to more of the tools that new learners use today was mentioned as desirable only when conversations led students to believe "their" technology could be integrated into the environment. Course links to lecture versions as podcasts? "Yeah! Oh yeah!" At the same time, hesitancy was expressed at the use of tools like MySpace™ and Facebook™ in the course experience. "You wouldn't want to see what goes on there." Learners clearly see a disjoint between the course learning environment and the technology environments where they currently "live" and engage.

Smartness

Student and faculty groups expressed a desire for systems that knew the individual better, and behaved "more like Amazon™" in remembering who they were, what they liked and where they left off. "Smart systems" should be able to learn the habits of an individual user, remember, and make the user experience less repetitive and fixed.

Decision-makers, faculty members, and students all want systems that do "some of the thinking." Administrators envision a system that can *"analyze the workflow and automatically support a smart system that can analyze the path and needs of the user."*

Faculty and students are adamant that more control should be given to them. Faculty members want to have the ability to track and analyze student work across system functions. For example they would like to track participation and contribution in email, discussions, chats, and collaboration areas as well as to aggregate and analyze an individual's contributions. Faculty want intuitive download of entire course assignments, not student by student, and then "smart" upload into the gradebook. Most agreed on a more intuitive and easy-to-use grade book. Additionally, some believed that all student contributions should be retrievable by student to identify and attribute ownership of student generated content. Faculty members envision more feedback, warning and notification mechanisms within the system as

¹ Short Message Service

well as pushed through to other technologies, such as mobile phones. One student expressed a desire for “alerts when things are changed or when due dates are approaching” (e.g. email, mobile phone, etc.).

Features and control should also be intuitive, easy to use and embedded with supports. For faculty members this included help functions, style guides, pedagogical scaffolding, and content development aids. Faculty would also like to see tutoring and automated supports for students so that the system detects a problem and makes smart suggestions.

Administrators see NG smartness as a strategy to improve teaching and learning while streamlining support services. Systems that provide pedagogical aids and guidance could improve the quality of instruction while reducing the demands of an instructional designer. “Smart error messages” would relieve frustration and time for both faculty member and support staff. Smart meta-tagging and searching could make accessing files and finding threads more efficient. A smart system would also be able to “gate” a student from opening new material until they had mastered an earlier assignment.

Environmental Features

Administrators often described a Next Generation of eLearning Environment that is “immersive” and that could support games, “worlds”, and context features that were integrated with all necessary or desired systems and resources to make environments less textual by design. Faculty members didn’t mention environment as a 3D, simulated or different world than the classroom, but some did express a desire for integration that provides access to people (advisors, library, departments and programs) as well as other technologies (personal response systems, handhelds, tablet PCs, etc.). Faculty members also want integration of tools and resources rather than hyper-linking from the course container to other authentication-driven systems. This was often seen as primitive, obstructive and non-engaging strategy for function access and use.

Students spoke of a desire “to move the course to” where they were: on the move and on their mobile devices. To be able to pull up key resources from their smart phones and to be able to receive course email at any desired location (“my work email address during the day and my personal email at night”) were high on the list of learner environment requests. Course-contained or school-contained only options for e-mail were seen as hindrances to access.

Conclusions

Overall, strong interest across the stakeholder groups lies in the need to improve speed, efficiency, intelligence, and intuitiveness of the current L/CMS. This is not a failing of the enterprise installation, or of the vendor brand, but reflects a maturity in use of the L/CMS as an enterprise system as well as a deeper dependence on the framework in teaching and learning: whether in face to face classes, e-enhanced or online. The L/CMS has become a significant container for the knowledge products of teaching and learning.

Faculty members focus most often on want more services that make managing the teaching load easier. Easier grading, assignment management and audio comment ability on assignments that intuitively open in the grade book are a few strong examples. Electronic assignments are seen as burdens that take too much time to download, track changes, and upload. "Let us open the assignment, audio comment, grade and close."

Administrators want to support, offer and provide stable and innovative services "under one umbrella." Single-source authentication and interoperability are high on administrator's scorecards, as is the issue of control, especially in the arena of stability and responsiveness to problems and performance.

Students want interactivity, mobility, synchronous communications and a faster, friendlier and more locally controlled interface.

Everyone wants a next generation system that is more than a "course management" container. Stakeholders across the L/CMS spectrum want an anytime, all the time, personalized experience of learning and teaching that utilizes all the currently available social tools, intuitive tools, smart agents and interactive environments we've come to expect from Web 2.0 and social computing.

Just as each L/CMS stakeholder views the system from his or her own perspectives, so does each researcher of this project. In the following appendix sections to this research report, McGee, Carmean, and Jafari share their individual perspectives on study findings and their reflections on the requirements or design specification of the Next Generation of eLearning Environment. Meeting with different groups, asking different questions and looking at the data from different perspectives and backgrounds led each researcher to consider different possibilities in imagining a next generation of eLearning environment.

Author's Reflections

McGee's Reflections: On Pedagogy

Heretofore virtual learning systems have been assigned and designed with the primary function of *management* and it is a label that demands revising. Systems management is indeed of paramount importance to campus decision-makers but it appears that the managed control at this level has left little for those who are actually using the system to manage. Faculty members must format their content to be viewed and operate according to system architecture, and students are presented from changing much of anything, much less take away what they want, when they want it. And as recent research and practice informs us, management by the *learner* is often key to learning (see Carmean & Haefner, 2003; Bransford, Brown, & Coking, 1999). The biggest challenge for Next Generation of eLearning Environment is that increasingly, and understandably, the learner is not only in a classroom of one (Maeroff, 2003), but also engaged in learning that extends beyond the electronic environment that is the L/CMS. As a physical being the learner *learns* a real, physical environment in which the technology only provides context, content and resources. The *learner* determines what they see, hear, do, and access. Thus a learner is in class while they are in the laundromat, cooking dinner, or driving to work, and they are in control. Most importantly, even if the learner is engaged in learning experiences, their engagement is typically one-to-one, with one-to-many being the exception. Thus the concept of *system as management* is not an operational. It does not describe what the system should be doing.

It's all about me!

Learners and faculty members have articulated the need to have a system that is centered on what they want and need. This requires a system that is adaptive and responsive. Such a shift from teacher-centered and directed (much espoused in the late 20th century and yet not fully accepted much less adopted), struggles against traditions of teaching as something done to a learner, and managed only by the instructor. It also challenges the notion of a system that is bounded and contained. We know about and in fact often preach the use of varied non-associated tools to support learning, most recently blogs, wikis, and podcasts. But is it necessary to have these tools *inside* of a system? Universities have been structured around the concept of courses and credit hours that are controlled for reasons of value and tradition. Students and instructors are interested in accessing just parts of a course, cross-connecting course content across sections of courses, and taking what they need and want from a course when they need and want it.

Such demands require that we stop thinking of higher education as a deliverer of courses but rather of well articulated and designed learning experiences offered through tools that the instructor and learner select.

Motivation indicates the reasons people chose to take actions, set goals, and maintain behavior and the effort they put into their actions. Yet motivation is something that varies not only between individuals but also between the contexts in which the learner exists and interacts. What is motivational in a classroom may not be when a student listens to a lecture on a podcast. Additionally, policy and practice often interfere with motivation because they are typically designed and articulated to address a generic set of learners many rather than the specific individual. For example, in 2006 the Texas governor ruled that state institutions should remove any peer-to-peer software from state owned computers (Perry, 2006). However, the determination of what define peer-to-peer was left up to the individual campus. For faculty members, staff, and students who had come to rely on tools such as Instant Messaging (IM) this rule interfered with their motivation to communicate in a timely and seamless manner. For learning environments to be motivational, they must be "smart" and acquire an understanding of the uniqueness of the learner and the instructor: their habits, choices, preferences, and even errors. We want functions that are symbiotic and intuitive, knowing more about us than we know about ourselves.

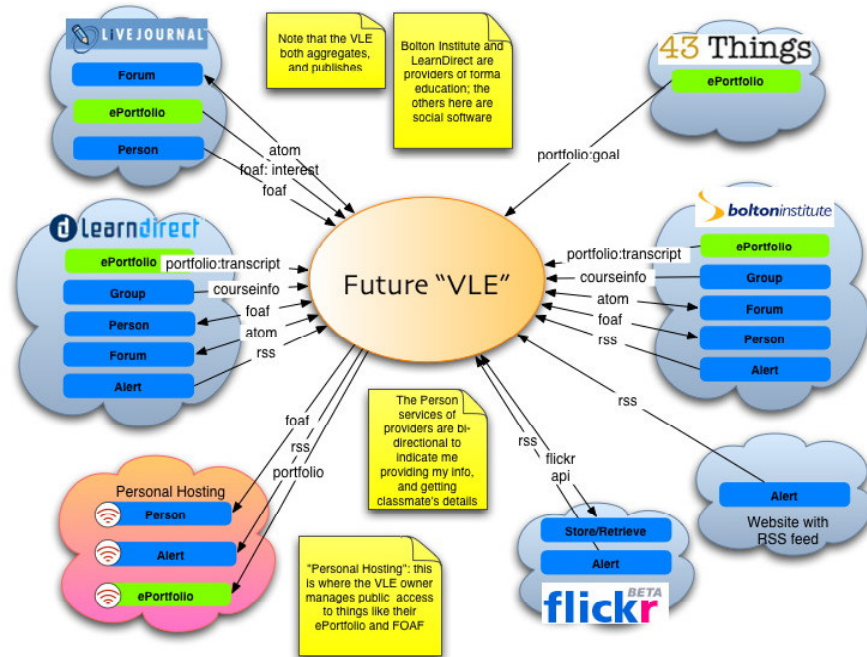
It's all about being there!

We want everything to be at our fingertips when we enter an environment be it real or virtual. This is the case with the future learning functions that must be ubiquitous. The push of emails to voice mail, assignments to inboxes, or discussions to harvesting nodes that aggregate themes are in demand and, most importantly, ease the cognitive load of the learning community. Related to the anywhere anytime access of learning materials (tools and resources that have been promised to us since the 1990s) is the ability for the learner and instructor to access their products as well as those of others anytime anywhere. Current L/CMS, in their conception as management system, shut the learner and instructor out after the semester has ended. Archiving and smart memory functions that support intelligent retrieval are non-negotiable.

Such conditions suggest an environmental vision of the future learning functions that won't be embedded in a system but accessed through a personalized entry point. Some envision this entry point as a portal or portfolio while others see a self-generated and determined point through which the learner (and instructor) select how and where they access the functions that are needed to achieve their goals and outcomes. Scott

Wilson's visualization suggests how such an entry point might look, see Figure 1.

Figure 1 Visualizing a Personal Learning Environment²



What's missing?

It is important not to suggest that functions, tools, and systems can help the learner learn in a deep manner that will result in transfer and retention. At least this won't occur in the foreseeable future for a variety of reasons, the least of which is the lingering tradition of 20th century schools and silos of knowledge that constitute merit and promotion in higher education. In the learner-centric learning environment envisioned and suggested by this study, we are missing the pedagogy. As a pedagogist, it is striking to me that so little was mentioned about the processes that we have come to know support learning. If we leave pedagogy up to the system or learner, I am not sure that truly meaningful learning will occur except for the deeply motivated learner. We also must consider the role and practice of scaffolding and how this can occur in virtual environments. Intelligent agents that are intuiting and responding to learner actions can provide a degree of scaffolding but there must be strategies for human-to-human scaffolding. Although only peripherally suggested in this study, next generation functions

² See <http://www.cetis.ac.uk/members/scott/entries/20050125170206>

must address the difference between remediation and learning. There is potential in smart learning objects that can recall a learner's previous interactions and errors then present new content and process. But before we can design such objects, we must acknowledge that learners may need remediation at any point in their university experience, and that completion of coursework doesn't mean that re-learning is never a possibility.

The trend in knowledge management towards open-ness (Diaz & McGee, 2005) along with social-ness (Wenger, McDermott, & Snyder, 2002) suggest a shift in how we are conceptualizing learning that occurs over the life of the learner, not in segments through elementary, middle, and high school, followed by post-secondary education and then job-related professional development. The findings of this study suggest the stakeholders are on their way to 21st century learning, if only the technology will support them.

Carmeans's Reflections: On Learning Design

*You have learned something.
That always feels at first as if you had lost something.
~H.G. Wells*

Case: A student cites Wikipedia during his final project presentation. The instructor hasn't heard of it, and asks him about this source. The student brings up the site and demonstrates the principles of collective knowledge in action. The instructor comments that this was not "peer-reviewed", which was a requirement of the research project and thus truly not acceptable. The student disagrees vehemently. "Of course it's *peer-reviewed*, and come on, how can thousands of peers be wrong?"

Case: At a conference awhile back, we were discussing this research project in a restaurant when the lovely young server interrupted. This is what Jenny said, a paraphrase of what I wrote down after she left the table: "I'm sorry, I overheard you talking, and since you're professors, could I ask you a question?" What could we say? Jenny took a breath and rushed on: "I finished school, with a degree in advertising and now I have a job in advertising. I don't like my job and it doesn't make enough money to pay my bills, so I wait tables at night. I was wondering why I couldn't have had the chance to take a course in what people really do, and the consequences of choosing a major, so that I knew what it meant to be in advertising?" We agreed this might be a good idea. "And not just what it means to be an ad rep, or accountant or architect, but how to behave like one, and behave like someone that knows what they're doing!" We asked her to explain. "I wasn't taught what I need to know for my job. You know, to think on your feet, present your case, use spreadsheets and PowerPoint. I should have learned

things like problem-solving, making decisions, using technology. I didn't learn what I need."

Case: Chris was failing my online class. Didn't login regularly and didn't respond as often and when requested. He would respond to my emails with excuses and promises to do better. I worried about him, until the week when students submitted their work as Web pages. The work was complex, the scholarship very good, the effort extensive. I wrote and told him how well he'd done, and how relieved I was to see him putting effort into the course. I asked him what had changed and if it could be sustained. "You were worried about how I was doing," he wrote back. "Plus, you asked for a Web page. I love doing Web pages. Instructors don't really care about what I'm interested in or what I think about. I learn more at work than I learn in any of my classes, and yet students are being told to stop working so many hours. If the assignment is interesting, there's time to do it."

Case: A faculty member complains about wireless access on campus, telling me that half the faces in his lecture hall are buried in laptops, typing away at who knows what, and no longer listening to him. "And the other half?" I ask. "They don't have laptops yet!" he fumes.

Overnight, something large shifted in the culture of teaching and learning and higher education was not prepared for the shift. For all the computers under the desks and Web and file and print and high-speed and wireless connections that Information Technology pushed out over the last few years, little has changed in how the institution looks at teaching and learning. Faculty embraced the new course management systems for convenience in managing the teaching load, but for all the resources poured into the technology (hardware, software, technical support) the course stayed the same. Administrators, who should have been addressing return on investment (ROI) all along, look the other way. Learners changed, skills demanded in the workplace changed, educational options outside the ivory towers grew, but for the most part, we held on, held out and "stayed the course".

The next generation project that our team undertook in 2005 looked to explore what it might look like if we were to change and collectively imagine a new learning environment, based on the thoughtful, reflective use of technology now possible, available and within reach. The team traveled to seven rather traditional institutions, asking stakeholders to share their needs, desires, and expectations for the future. Almost all respondents seemed sure that the technology they wanted – *light, nimble, mobile, smart, helpful, intuitive* – would continue to dominate the discussion of changes needed in teaching and learning.

Students especially made the case that it's time for a change in how we think about teaching and learning, and that the change was long

overdue. It was time for *them*, and for *their* technologies. They wondered why there's so little incorporation of the fleet tools they use everyday, tools they know are available (for free, they point out) but that instructors don't use. Why, in an age of speed and instant response, does everything take so long and seem so clumsy and hard to use? They gently told us that it was time for the academy to get with the program.

Learners, often reluctant to claim they know more than their instructors about what should change in the current learning environment, easily came up with ideas for better, faster, smarter learning systems. A learning environment shouldn't be so contained, so course-centric, so static and locked away from the technologies they love: IM, text messaging, MySpace. Actually, on second thought, they told us that they really didn't want instructors to invade MySpace ("You wouldn't want to see what goes on there," we're told), but they do want the learning environment to use the same tools: blogs, wikis, home pages, public messages, knowing when others were online in the course room, etc).

They found current learning environments ...dull. The current containers were irrelevant to the demands, tools and skills they felt they would face when they entered the workforce. For all the slow, backward, clumsiness of the current systems, the environment wasn't even easy to figure out: why the navigation was confusing and took "too many clicks", why assignments get lost, why the discussion can't be sorted with newest on top, why the system doesn't learn anything about the learner and never sends reminders or status messages. Why the learning environment is so...dumb.

Time and the voices of the next generation of learners bring winds of change to higher education. We listen to the learners, listen to the winds, and look toward a horizon where clouds look gray and threatening due to what we might lose as a storm rolls in. For those of us who loved our education, the chalk and paper and chairs facing forward while we listened to (mostly) men smarter than us, we wonder what's ahead. Yes, faculty embraced the course *management* system, loved the e-convenience of the grade book, tracking assignments and posting announcements. We feel that we've come far in our incorporation of technology in learning, but we're worried about the traditions that might end with too much technology. Consensus on a next generation learning environment is muddled, with some wanting more and better courses moved to the Web and others resisting the "accidental pedagogy" of the electronic course-in-a-box. The next generation learning environment is as confused and as contentious as a busy Wikipedia discussion page.

In some things, learners want the same next generation tools as the faculty. Everyone wants every favorite tool available at their fingertips, but

all want the LMS to be easy to use. We want a rich site within the LMS environment, but we want it to have a small foot print and be fast. Administrators talk of open source, but learners wonder why we're not looking at the popular free tools (Skype, AIM, Flickr, Furl, MySpace) they've already incorporated into their lives. All believe access should magically exist with an environment of 24/7, stable, customer-centered support.

Learners want PDA-ready course messages and announcements sent via sites that extend the 'course room' to the long-promised anywhere/everywhere environment where they now learn. They want it all and they want it soon. They want it to respond to the need for easier access from mobile devices and faster, smarter, more personalized experiences.

Overnight, this surprising sea change happened for teachers, learners, the institution and society at large. It would be a mistake to think any of us can last out the storm, stay huddled and expect learners to continue to come to traditional education gladly. They have new things they need to learn, and they expect learning to come from the diverse places they now find knowledge. Learning is no longer contained in the classroom and lecture halls where chairs are often still bolted to the floor facing forward. Learners want less seat time and more learning. Next generation learning is an environment that includes Google, IM, SMS, Web 2.0 social knowledge and software, intelligent systems with memory and personalization of the learner's needs, mobile learning, wireless learning and even teaching Jenny what she needs to know. Learners, parents, alumni, regents and society look to higher education to do the right thing: teach from the fields, the streets, the river and the bright, shining city of virtual space, social networks and anytime/anywhere access. It isn't the technology that's stopping us, for technology and the learner have left us behind. We have the ability to teach and to learn through thoughtful use of technology in the delivery of diverse, innovative, social, engaging, relevant, anytime/all the time discovery that brings the world to the course wherever it may be found. A bright, shining city indeed.

Jafari's Reflections: On Next Generation eLearning Environment

Having served as the principal investigator and architect of two highly popular L/CMS, Oncourse and ANGEL, and given my enduring passion to strive to design systems that better serve the learning process, I have been driven to design and propose a new model and system for the next generation of eLearning environment. My study has moved me to transform my half-decade-long thinking into real form by defining and proposing a new conceptual design and technical framework for the Next Generation of eLearning Environment. I use the term "Next Generation" to imply as the

next set of concepts and framework that will replace the current systems and solutions. I use the term "eLearning Environment" as a complete set of technology tools that students and faculty members may need to support their day-to-day learning, teaching, and research.

In order to conceptualize then create a blueprint for the Next Generation of eLearning Environment, one must have a good understanding of the stakeholders, both on what they want (the technology/tools) and how they prefer its presentation so they are comfortable using it (the human aspects). Furthermore, we need to investigate the limitations and shortcomings of current L/CMS systems so as to determine whether the existing system design has the capacity to fulfill the new needs and requirements of today's learners.

Students and faculty groups interviewed in this project explored their perspectives on the technology tools and human aspects of the technology, while the third stakeholder group -- the CIOs, technology managers, and support personnel -- probed the technical and integration aspects, with increased focus on models and systems with economic advantages.

Global system instead of a closed system. Interestingly, today all major L/CMS products, both commercial and open source, are using a very similar system design and framework to that of the original L/CMS system that was invented in the mid to late nineties. That system uses a dedicated or isolated L/CMS computer server that services a campus community or several campuses within a university system. The L/CMS software may run within a computer server located on a campus or it may use a hosting service which in most cases is supplied via an ISP by the vendor marketing the L/CMS software. Under this model, L/CMS services and collaboration are characteristically limited to only members of that institution. For instance, a faculty member is unable to share a learning object with colleagues beyond the boundaries of the campus using the L/CMS tool. Students within a class can participate in a learning discussion only among themselves, not with students located at other campuses taking a similar course.

Indeed, it seems that existing L/CMS systems are designed around the traditional concept of the university's physical campus and that there is a brick wall isolating the campus from the outside world. Breaking down that brick wall that prevents the L/CMS system from running in various institutions will certainly offer additional learning and collaboration opportunities, and at the same time broaden the system by making it more social and entertaining. Analyzing the attributes contributing to the popularity of new social networking software, especially Myspace™ and Facebook™ provide insight into its attractiveness -- that it is primarily due to the openness of its services to the global community, not just a campus community. MySpace™ and Facebook™ encourage students to socialize with

those attending other institutions, not just those on the same campus taking the same course, or those wandering in the halls or meeting in the student cafeteria. Rather, we need the next generation of L/CMS to excite the business of teaching and learning by promoting cooperation among virtual global pools of instructors who associate with peers teaching similar courses at other campuses so that they can share and exchange learning objects within their course management system, and of students who are taking such similar courses. Imagine the next generation of L/CMS offering capabilities to look at what other faculty members have created and are willing to share even as they provide the same learning objectives.

The design of the current L/CMS systems does not and cannot offer the means to make these new global learning and teaching collaborations easily and transparently possible. We need a new framework to support global socialization for learning collaboration among all students and for teaching and research collaboration among all faculty within and outside of the campus brick walls.

Lifelong access to course materials shall be considered as a new requirement for the Next Generation of eLearning Environment. As some students like to store their class notes and materials in a box within their family's basement, there is a need to have virtual and lifelong access to those course materials placed in an L/CMS course shell. The current L/CMS framework, system design, and institutional policies do not offer a simple solution for students to maintain and access their course material after they leave the campus. Similarly, faculty members would like to archive and carry over their L/CMS course shells should they switch campuses, if they enter a different professional life, and as they go into retirement. To them it is like holding onto personal research data, and they want to keep a copy of it handy for potential use and future research.

The current L/CMS system offers capabilities to convert a course shell from one system to another; however, future use of that material still requires access to an L/CMS software that the faculty member may no longer have upon leaving a campus. As such, there is a need for a personal L/CMS, something that establishes access above and beyond current institution association.

Environment or comprehensiveness of the toolbox should be considered as one of the important requirements for the Next Generation of eLearning Environment. As most of us enjoy using Microsoft Office Suite as a comprehensive toolbox for our day-to-day business, the Next Generation of eLearning Environment should offer similar conceptual and technical features, all within one comprehensive toolbox or one environment. We benefit from using Microsoft Office because it offers almost every tool that we may need for our daily business activities, from word processor to

PowerPoint to spreadsheet, and even more advanced tools that some of us may need such as the Access simple database and the FrontPage Web-authoring tool. The learning experience obtained from one tool can be applied to another tool, and a work created in one tool can be easily transferred or copied and pasted into another one. I perceive a Microsoft Office type of environment for learners by creating a comprehensive toolbox for the Next Generation of eLearning Environment.

Figure 1 illustrates a new design framework for the next generation of eLearning environment. It could be seen as a Swiss Army knife of eLearning, a hosted solution offering lifelong eLearning tools and services.

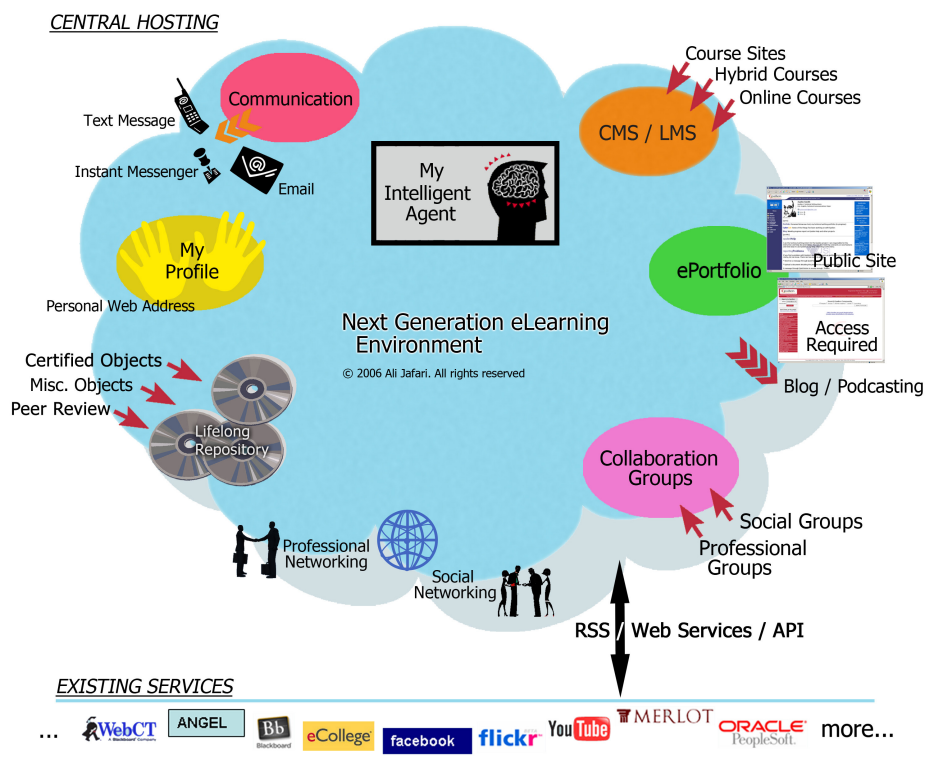


Figure 1: Jafari's proposed framework for the next generation of eLearning

From open sourcing buzzword to outsourcing reality. My analysis suggests that we may see a progressive migration from the notion of open sourcing toward outsourcing. One of the most promising benefits of the open source solution is its cost effectiveness, its ability to save thousands of dollars of licensing fees. In almost every campus interview, we heard complaints from campus technology leaders about the increasing licensing fees imposed by L/CMS vendors. As a means of making the

strategic decision to stay within their limited IT budget for L/CMS support, many technology decision makers are told to consider adopting an open source system which is free, with zero licensing fees, but which may require outside vendor help for setup, customization, and upgrades. Other factors, such as the ability to refine the environment and to collaborate with other participants on building the next version, have energized many technology leaders to buy into the notion of L/CMS open sourcing. However, after extensive research, my personal analysis and perspective suggests that while open sourcing may offer a viable, cost-effective, and reliable solution to larger universities and those with bigger IT budgets, small campuses and professional schools will gradually be sold on the notion of outsourcing instead.

In the outsourcing model, the campus gets a turnkey solution for its L/CMS and Next Generation of eLearning Environment. Imagine a third-party company is totally responsible for running the servers and providing licenses, security, reliability, backup, tech support, and the like. This not only reduces overall operational expenses but also puts the business of technology in the hands of experts. In the old days, campuses began to think about outsourcing the electrical power by turning off the internal power generators and buying electricity from the power companies. Most recently, university physical plant departments switch many of their services to outsourcing. For instance, to renovate a classroom, outside contractors are hired rather than using internal physical plant personnel. On some campuses, even custodial services are outsourced.

So why not outsource IT? Why not outsource L/CMS? Why not outsource the next generation of L/CMS? Today's CIOs and IT directors must offer more and better services as increasing numbers of students and faculty demand superior and reliable IT services, and indeed they must do so to stay competitive in our fast-paced and changing world. A similar situation happened to the directors and managers of campus physical plants when required to offer more services as additional buildings were built. More building maintenance did not necessarily come with a bigger budget, so physical plant directors had to face the reality of doing more with the same budget, and outsourcing proved to be the answer. With this, I see the Next Generation of eLearning Environment will likely turn to an outsourcing model rather than one maintained by internal IT personnel.

Smart L/CMS. The current releases of L/CMS software have impressed and excited a large number of stakeholders as they offer long-awaited features and improved ease of use. However, most brands still offer a static system limited to members of a course community. As students have different learning styles, expectations, desires, and speeds, the ideal L/CMS system is capable of offering more personalized capabilities to each

user. More specifically, the Next Generation of eLearning Environment should be smart, having the capabilities to think, reason, and react intelligently.

There has been some discussion on the use of Intelligent Agents as a means of personalizing and making smarter the learning environment (Jafari, 2002); however, little has been done on either the conceptual or technical development of such an intelligent system. Today, only one of the commercial L/CMS systems offers some intelligent functionality within the L/CMS environment. Extensive collaboration is needed between the producers of L/CMS technology and academic researchers in order to develop the Next Generation of eLearning Environment with smartness. This is an area that the L/CMS vendors and developers may not be able to do without scholarly collaboration with academic researchers.

Notes

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