

The Networked Learning Environment

Stepping Beyond Courses to a More Expansive Online Learning Experience

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Blackboard®

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EXECUTIVE SUMMARY

e-Learning is on the cusp of a transformation. For several years, it has been a matter of educational institutions implementing systems and processes for delivering courses online. That was a logical first step, one that has largely been accomplished.

Today's e-Learning challenge is considerably greater than just bringing courses online, one with a pay-off that will revolutionize education in ways that online classes only begin to suggest. That challenge is to break through course-based limitations in order to create true **Networked Learning Environments**.

A Networked Learning Environment in the Internet age applies new technology to a very old concept—that learning is much more than classes and grades. It is about the learning that takes place in a vibrant community of people and resources. The Internet has removed the limits of time and proximity that once restricted this community. In a true Networked Learning Environment, any student, instructor or researcher can access any learning resource at anytime from anyplace.

Similar to the Internet, a Networked Learning Environment is really a network of networks—as simple as a lecturer and her class or as complex as a global web of instructors collaborating to develop a brand new curriculum. The power of the Networked Learning Environment today is that it creates unlimited possibilities for students and faculty, far beyond the limitation of books, bricks and mortar.

While most institutions are evolving toward the Networked Learning Environment one step at a time, some are taking the leap all at once. This white paper describes the NLE and lays out Blackboard's vision for providing solutions that will help educational institutions realize their goals.

“In fact a university should not be a house but a village.” —Thomas Jefferson

CREATING THE LEARNING COMMUNITY

When Thomas Jefferson was planning the University of Virginia, he wrote, “In fact a university should not be a house but a village.” His designs for the original campus would encourage interchange and relationships among professors and students in an open environment that still kept all the resources of learning in close proximity.

Jefferson's “Academical Village” was one architectural expression of something that has been true since the first universities of medieval Europe—that learning is a community function. It ranges from the dyad between teacher and pupil to the residential college and beyond. Throughout history we have created learning environments that were “networked” in some way in order to bring together books, labs, libraries, thinkers, teachers and students in pursuit of learning. In the past, however, networked learning environments were limited by time and distance. For community learning to be effective, resources had to be close together.

That was until the maturing of the Internet as a medium for communication. In today's world of e-Learning, Jefferson's “academical village” has grown in depth and breadth and is no longer restricted by time - students everywhere are benefiting.

Today, as part of the Internet2 project, for example, students might log on to hear noted authors in the United Kingdom, France and the United States discuss Allen Ginsberg's poem Howl. Afterward, they could join students from Philadelphia to Paris in discussion board conversations on favorite readings and search for critical reviews of Ginsberg's works in digital repositories throughout the world.

As the limits of time and place continue to retreat, educational institutions now find themselves at another phase of this evolution in Learning Environments. Equipped with the power of today's digital networks and no longer content to remain within the boundaries of the classroom, institutions are setting a new course to Networked Learning Environments where the library on another continent is as close as the learning lab across campus.

ROOTS OF THE NETWORKED LEARNING ENVIRONMENT

Our current vision of a Networked Learning Environment owes much to the work of pioneering groups like the National Learning Infrastructure Initiative (NLII), Internet 2 and the IMS Global Learning Consortium. During the Internet boom, thought leaders from groups like these called for new approaches to learning. In her seminal 1994 paper, *The Need for a National Learning Infrastructure*¹, Carol Twigg encouraged thinking about learning in a much broader context—well beyond the traditional borders of the residential college.

“We need a new infrastructure to serve our changing definition of learning,” Twigg wrote, “An infrastructure that turns the teaching infrastructure on its head to focus on the learner. Unlike today’s infrastructure, which relies on highly individualistic institutions, a learning infrastructure will be national in its scope based on collaborative efforts among institutions that scale beyond the local level.”

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The NLII went on to propose a set of characteristics for this infrastructure, many of which are now possible, or becoming possible, as part of a Networked Learning Environment:

- Learner-centered, not teacher-centered
- Pedagogically flexible
- Supportive of learning anytime and anywhere
- Active, not passive, student learning

Twigg predicted, “When implemented, an NLI will simultaneously increase access (via the network), improve quality (through the availability of individualized, interactive learning materials) and contain costs (by reducing labor intensity in instruction). To achieve these goals, we must first create an advanced technological infrastructure and we must stimulate the production of high-quality content materials.”

A decade later, thanks largely to the Internet, much of the advanced technological infrastructure, the “pipes”, is in place. Now the challenge is to leverage these underlying pipes with a platform that connects teachers, learners and researchers for anywhere, anytime learning.

First Steps: A Course-Centered World

Education’s initial steps toward e-Learning involved taking existing resources like course materials and making them available on the web. It was the same thing other sectors did upon first embracing the Internet, such as the early days of e-Commerce when businesses simply put their brochures online.

At the time, Blackboard was created to serve as the primary contractor to the IMS Global Learning Consortium standards project. IMS is a consortium of universities and companies developing technical specifications that will allow the technologies behind Networked Learning Environments to work together. As the original contractor, Blackboard helped shape those early specifications and remains the leading adopter of open standards. Later, in 1998, Blackboard released its first commercially-available software, **Blackboard CourseInfo**TM (developed at Cornell University).

Not surprisingly, Blackboard, and the other e-Learning software companies that would follow, took a “course-centered” view of the problem: How can we make it easy for non-technical instructors to put their existing course materials online?

Since then, course management systems like the Blackboard Learning System have grown in use and importance at all levels of education in every country in the world. In the United States alone, according to the 2003 Campus Computing Project survey, 33.6% of all college courses use course

¹The Need for a National Learning Infrastructure, by Carol A. Twigg, Educom Review, 1994.

management tools, growing from 26.5% in 2002, 20.6% in 2001 and just 14.7% in 2000. Alone, the Blackboard Learning System, the most widely used solution in the world, has been the platform for millions of users at thousands of institutions.

Not only are most institutions now using course management systems in some form, but many of them are now taking the next step to standardize on a single course management platform across campus rather than using multiple systems. According to a 2002 Gartner survey, 73% of Higher Education Institutions have named one, IS-supported course management system for the entire institution.

Indeed, with the problem of putting courses online largely addressed, educational institutions can choose from several options to match their size and scale.

The great challenge for e-Learning today is how to step beyond courses to incorporate all of the many other educational resources, both traditional and digital, into the online learning experience.

From Courses to Communities

As e-Learning has matured, however, institutions have discovered that while courses are important, they are just one facet of learning. In fact, they may be a fairly small part of the average person's learning career over a lifetime.

The great challenge for e-Learning today is how to step beyond courses to incorporate all of the many other educational resources, both traditional and digital, into the online learning experience. How do we connect and integrate courses with libraries, research labs, advisors, peers, museums, alumni, parents, other institutions and the many other learning resources on campus and off? What's more, as these environments expand, how do we administer the resources, manage the systems and establish order in the volumes of digital materials multiplying throughout them?

The answer is a Networked Learning Environment that enables any student or teacher to collaborate with educators, evaluate academic performance and access learning resources at any time to achieve their educational objectives. Advanced NLEs include the ability to find people and resources not just at the home school, but at other universities and institutions as well, and to do it within an environment that students and faculty can readily master without the need to learn new software, interfaces or passwords for each task.

Just as courses and course management have evolved rapidly to capitalize on the power of the Internet, so too have many other learning spaces and technologies. Libraries, for example, that once focused on circulation, catalog management and book inventories, now pursue goals such as electronic reserves and patron interfaces. Similarly, publishers are moving from hardcopy to software-enabled content. Networked Learning Environments connect courses, teachers, learners and researchers to all these other evolving areas or "nodes" of the network.

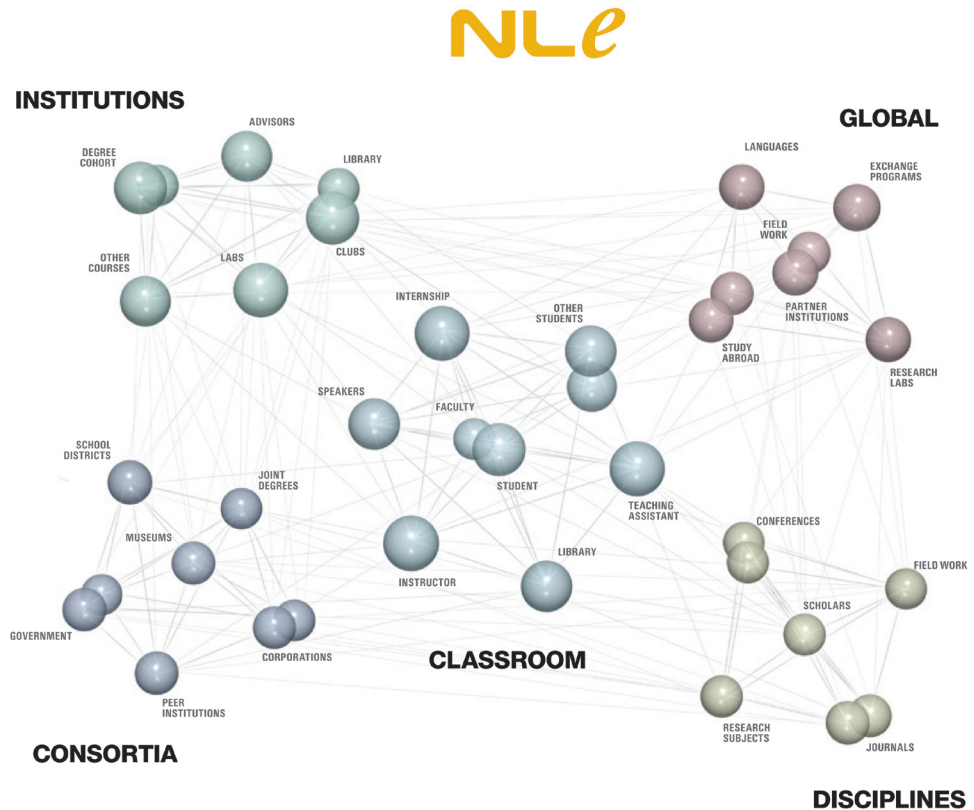
"Course Evolution"

Ultimately, the result of these connections is that the very nature of what we mean by a "course" is evolving to match the strengths of the networked world. Again, for comparison, consider how far e-Commerce has come from the days of simply putting brochures online to the entirely new commercial models enabled by e-Bay, Priceline.com or Amazon.com.

Spearheaded by leaders like the Center for Academic Transformation, this metamorphosis is well underway. The Center's Roadmap to Redesign initiative (part of the Program in Course Redesign) selects 20 institutions per year interested in leveraging the capabilities of information technology to transform their academic practices. One example is the Emporium model which merges several nodes in a Networked Learning Environment. In this course redesign concept, the computer lab is the classroom. Students are led by instructional software and get immediate feedback from the system on problems and assessments. Full-and part-time faculty and graduate assistants are on hand to provide help when needed. Students engage in active learning

while receiving more individualized assistance than a traditional classroom environment could ever offer. It's just one of many new models emerging from the effort that will see redesigned courses piloted in January of 2005 and launched the following September.

networks. Each is its own Networked Learning Environment, but each is also part of others, such as a full time student of one university who also takes courses at another. The more connections that can be made, the richer and more powerful the network.



THE NETWORKED LEARNING ENVIRONMENT IN PRACTICE

So what do Networked Learning Environments look like? What outcomes do they help bring about for teachers, learners and researchers? In a true Networked Learning Environment, different learning spaces, participants and modes are connected in new ways, supplied with new kinds of materials and supported by powerful applications, all with the goal of enhanced outcomes. Like the Internet, the Networked Learning Environment is a network of networks, a series of nested communities. Beyond the relationship of teacher to student as an elemental form, Networked Learning Environments expand outward to classroom, discipline, department, institution, national and international

Key Characteristics of an NLE

A true Networked Learning Environment has five key characteristics that separate it from the course-based world of traditional e-Learning:

Ubiquitous access to learning resources, both people and content. A Networked Learning Environment enables efficient, navigable repositories for content and other learning objects at the student, instructor, organization and institution level. Users can exchange, store and update these objects easily without associating them with a course. In addition, NLE's support connections and access to learning resources at other schools, institutions, labs, museums and more. Anywhere access means more than just a student with her laptop anywhere on campus, it means accessing a learning resource

wherever it resides—on a fellow student’s shared virtual hard drive, in a department-wide content repository or in the library at another institution.

A common user experience that seamlessly incorporates other learning applications. While it may be a while before we reach the full level of transparency that exists between web browsers and plug-ins for every single application, a Networked Learning Environment has a common, customized interface that unifies all of the most common learning tasks and most of the less common. Third party and homegrown applications integrate seamlessly to core systems and reflect the look and feel of the institution’s Networked Learning Environment. Standards-based content from publishers, commercial developers, faculty members, students and colleagues at other institutions incorporate easily into larger frameworks.

Assessment and tracking across the learning career. Where course-based systems capably provide assessment, outcomes management and progress tracking within the context of classes, Networked Learning Environments provide facilities for doing so across a set of classes, a semester, cycle, major or learning career. e-Portfolios, for example, allow students and faculty to carry their accomplishments from one school to another or even into the job market. Increasingly under pressure to show consistent evaluation methods, institutions can manage and document progress across their programs and departments in multiple ways.

A customizable, role-enhanced environment that supports student-centered learning and instructor-optimized administration. In a true Networked Learning Environment, individuals become the center of processes based upon their role (or multiple roles). Students, for example, become the center of the learning process as predicted by the NLI through features such as customized interfaces, adaptive release of content and e-Portfolios. Meanwhile, Instructors benefit from a wealth of tools and services that increase their efficiency and reduce administrative time. When a student or teacher is also a researcher, collaborative tools enable team projects from the chemistry lab to the writing center.

Access and participation in a robust knowledge-sharing network. When it comes to connectedness, the true Networked Learning Environment is about capabilities that become active and productive through relationships, both real and virtual. It’s one thing to say that it is possible to search learning repositories at other schools, quite another to get the pathways, instructions and permission to do so. As more schools enable their NLEs, the meta-network grows, but each requires consistencies and communication channels with the others. If you build it, they will come, but will they speak the same language?

How Institutions Are Moving to NLE’s

Depending upon factors ranging from when they became interested in e-Learning, to how supportive the administration has been in encouraging adoption, to its particular educational mission, institutions today find themselves at various points along the path from course-centered approaches to early stage Networked Learning Environments. In fact, some institutions may find that parts of their institution are farther along than others. As education consultant Judith Boettcher told Syllabus Magazine, “So you’ve got a pocket on campus that’s in the year 2020 and you’ve got another pocket that’s back in 1965. I think one of the patterns is that we just have a lot going on. There’s a lot of input to the classroom. It’s not just self-contained.”

Though each situation is unique, institutions often begin to take steps toward a Networked Learning Environment when course management and other academic systems have become mission critical, so embedded in campus life that it is hard to imagine academic life without them. It is because many institutions have reached this stage today that the transition to Networked Learning Environments has become such a central direction for e-Learning overall.

Some schools will address the technological issues of scale that come with a new enterprise-grade model, but will be convinced to stop there, simply adding new features and functions to their course-centered approach. Others will take the path of the true Networked Learning Environment, breaking the dependency between courses and content. While courses are still essential, these schools

will look for a platform that does more—from campus-wide access to shared learning objects, whether associated with a course or not—to better support of branding, collaborative file storage, content and file management and role-based information delivery,

Achieving Transformation

Joel Hartman, CIO of University of Central Florida, noted recently, “Over the last decade or so, both in higher education and in the business world in general, computer networks have become absolutely central and mission critical to virtually every business process that we have. The good news is that we’ve wanted to build network-based services, and we’ve done that. And now that we have them, we find that they impact almost every aspect of the institution and institutional life.”

Each semester more schools are beginning to reach the point where they are transforming teaching and learning in ways large and small, where e-Learning is impacting every aspect of academic life. The course-centered model is being replaced by a culture that seeks to connect a community of people and resources around student-centered learning. Institutions are exploring entirely new teaching, learning and research interactions. These include lifelong learning opportunities, access to learning content anytime from anywhere, and the ability to collaborate with global consortia.

The 2003 NLII Review put it this way, “Research tells us that learning occurs best in an environment that is resource rich. It should support active and collaborative learning; incorporate authentic, real-world problems; and provide ongoing assessment. Fundamentally, learning is about moving from a state of disequilibrium and into a state in which we are searching for new resolutions, new meanings, and new connections. It is about making connections...”

As far as many institutions are going, there is more coming to the Networked Learning Environments than can be seen today. Like any paradigm shift of this magnitude, the most profound effects aren’t even imagined until one has neared the summit. What Internet Bulletin Board user in 1992 could have foreseen blogs or streaming media? They were unthinkable without the web’s environment.

Projecting out, one can picture Networked Learning Environments that are seamlessly integrated with library e-Commerce systems or that offer federated searches across other schools, consortia, corporations and government research libraries. Just as the Internet exploded in applications and uses with the creation of the web, e-Learning is about to experience a similar transformation as more and more schools transition from the limited course-centered view in order to introduce their own interconnected Networked Learning Environments.

A COMPREHENSIVE E-LEARNING SOLUTION FOR THE NETWORKED LEARNING ENVIRONMENT

At Blackboard, we have built a comprehensive e-Learning solution that recognizes the challenges, requirements and rewards for institutions building Networking Learning Environments. While there are many independent products on the market for managing courses and constructing portals, Blackboard has deliberately focused on developing a complete family of solutions. The **Blackboard Academic Suite™** provides a common platform for all of the essential interdependent features, functions and services that make a true Networked Learning Environment.

The Blackboard Academic Suite

As the only solution for enabling true Networked Learning Environments, the Blackboard Academic Suite is a unified solution that maximizes the independent strengths of three best-of-breed applications: the **Blackboard Learning System™**, the **Blackboard Community System™** and the **Blackboard Content System™**. For institutions building their Networked Learning Environments one step at a time, these applications are also available independently.

Rather than learning to use multiple applications, once students and instructors become familiar with one application in the Blackboard Academic Suite, they easily master all Blackboard applications. As a single platform, it saves dramatically on the data and application integration costs that are needed when purchasing standalone solutions, as well as reducing maintenance and training costs.

The Blackboard Learning System enables instructors to create and manage course content, use publisher content, evaluate performance and communicate with students.

The Blackboard Community System enables institutions to connect users to online academic communities, deliver targeted content to diverse user groups, incorporate e-Commerce into the learning experience and take advantage of other features that enhance learning, campus life, outreach and branding.

The Blackboard Content System helps institutions manage the growing volumes of content that are being created and shared by instructors and students. In addition to content management functions are features for e-Portfolios, virtual hard drives, e-Reserves and more.

AN OPEN COMMUNITY OF PRACTICE IS THE KEY

Since the defining characteristic of a true Networked Learning Environment is connectivity, the first duty of a platform must be its ability to communicate.

A true Networked Learning Environment is an interactive community with an infinite potential for increasingly efficient connections. Only Blackboard can bring that vast community together through an architecture designed specifically for open standards, open architecture and open content channels.

Open Standards

Educational institutions construct their highly personalized Networked Learning Environments on the Blackboard Academic Suite platform using a variety of tools, some of which are developed in-house, some created in collaboration with peers and others licensed from commercial providers. In fact, the most interesting sources of re-usable learning technologies are college and university developers who work every day with faculty across many different disciplines.

These technologies must easily integrate with the core Networked Learning Environment platform,

which is why Blackboard has been integrally involved in standards work since our earliest days as the primary contractor for IMS. In addition, we are actively participating in ongoing efforts including SIFF, ADL SCORM, JA-SIG uPortal, Internet2 and others. For example, great results have come from our work with Shibboleth to address one of the most demanding challenges to building true Networked Learning Environments, the need to traverse multiple authentication systems in a way that is transparent to the user.

Open Architecture

Flexible, extensible and open, the architecture underlying the Blackboard Academic Suite is the necessary foundation for the true Networked Learning Environment. **Blackboard Building Blocks™** technology empowers academic institutions and independent software vendors to create sharable, re-usable web applications that can be deployed on the Blackboard Academic Suite platform. This open systems approach makes it easy to conduct community outreach, connect to new constituents, integrate other learning resources and build pathways to new tools and solutions.

More than 200 independent developers at educational institutions and software companies take part formally in the Blackboard Developer Network, plus countless others develop software solutions with the free Blackboard Building Blocks SDK. There are more than 115 community-developed applications available in the Blackboard Building Blocks catalog, many of which are open source.

Open Content Channels

While a Networked Learning Environment must operate seamlessly with various applications, it is the knowledge created and exchanged through those tools and channels that is the focal point of learning. In addition to working on content- and repository-oriented standards projects such as SCORM and Merlot, Blackboard focuses on three primary content issues to ensure institutions will have a versatile environment for learning.

- Blackboard is **integrating publisher content** into the Networked Learning Environment in order to enable advanced, interactive, software-

enabled content. In fact, major education publishers and content providers have developed more than 2,500 digital course supplements (Course Cartridges) for Blackboard environments.

- Blackboard is focusing on **Library integration**. Library budget resources are increasingly focused on expanding collections to showcase the growing volume of scholarship and research coming out of educational institutions. Blackboard is working to integrate library content into the Networked Learning Environment so that a wider community can find, share and reuse these valuable learning resources.
- **Content management** is one of the most pressing challenges for institutions, both to address today's digital content explosion and tomorrow's need to connect isolated content stores. Our strategic focus in this area is creating the discovery channels and making the content capable of operating seamlessly in a Networked Learning Environment.

CONCLUSION / SUMMARY

In this paper we have laid out our view of where institutions are going on their e-Learning journey and how we can help them reach their destination. I am really excited about the unlimited educational possibility for teachers and learners that a true Networked Learning Environment can create. We at Blackboard are working very hard to build solutions that enable these powerful environments for the educational experience.

As we pursue this goal, we often consider the question of whether one can ever "really" reach the destination of a true Networked Learning Environment. After all, many of the best mission statements are those that are never quite achievable, even as they define a clear objective against which progress can be measured. Frankly, I have concluded that the question is not the right one to ask. Surely, with the capabilities of the Internet always changing and the imagination of educators always expanding, the idea and shape of a true Networked Learning Environment will continue to evolve at a rapid pace. But just as there is no such thing as achieving "full" education or "full" knowledge, it serves us best as a goal on the continuum. Indeed, with the benefit of suite-based technology, architected to be open and extensible, and a growing body of standards driving increased interoperability, we are well on our way.

Blackboard
Academic Suite
learning System community System content System



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