

**NASCIO Recognition Awards Nomination
2009**

Cross-Boundary Collaboration and Partnerships Category



NORTH CAROLINA COMMUNITY COLLEGE SYSTEM

North Carolina Learning Object Repository (NCLOR)

Executive Summary

The North Carolina Learning Object Repository (NCLOR) is a collaborative endeavor to collect, consolidate, and share digital learning resources across North Carolina's educational institutions. The NCLOR is designed to increase the efficiency and productivity of K-20 teachers across the state by reducing duplication of effort associated with course development, which is especially important during times of economic hardship. The NCLOR provides a centralized location for the acquisition, collection, sharing, and management of quality learning resources that allows teachers to reuse, adapt, and modify resources for use in traditional or distance learning environments. Our associated organization of Virtual Learning Community Centers (<http://vlc.nccommunitycolleges.edu/>) works to develop interactive and engaging online content that resides in the NCLOR and integrates with various Learning Management and Course Management Systems (LMS/CMS) platforms for easy course development anywhere in the state. NCLOR participants include representatives from the NC Community College System (NCCCS) with 58 colleges, UNC system (16-university campus), North Carolina Independent Colleges and Universities (36 private institutions), the NC Department of Public Instruction (2496 schools), and NC Virtual Public School.

The NCLOR is hosted by its primary partner, the North Carolina Office of Information Technology Services (ITS), which provides application hosting and broadband connectivity for the vast majority of North Carolina community colleges and state agencies. ITS is fully integrated with MCNC, which provides the UNC data network, affording seamless access to applications and institutions served by either. The NCCCS and ITS have enjoyed a successful partnership for decades.

The NCLOR was made possible by remarkable leadership in North Carolina, including the current Governor, State CIO, the NC e-Learning Commission, and supporters in the General Assembly. This support has been manifested in funding and creation of a fiber-based educational data network capable of supporting centralized assets such as NCLOR. Thus, access to a PreK-20 NCLOR from every educational institution in NC is now possible. Further, the staggering number of online students at the NC Virtual Public School, NCCCS, and UNC system demands a uniform, robust, and cost-effective array of assets that 1) provide high-end resources to students of all ages in a seamless fashion, 2) are interoperable with current learning technologies, and 3) realize economies of scale in all areas.

Representatives from all NC educational sectors participated in creation and development of NCLOR from inception to production. A unique and serviceable set of "business requirements" was developed to guide NCLOR development. Selection of vendor software for NCLOR was via an international RFP process that identified the "best of breed" solution. The NCLOR began production in January 2008, fully integrated with CMS(s) and data systems, and fully operational for our internal and external partners to create sharable content. The project's total cost to date is \$965,700 and under budget. Based on estimated reductions of instructor and administrative time, annual savings in cost avoidance could reach \$1,670,400.

C. Description of the business problem and solution

Development, access, and reuse of digitized learning content are enormous challenges for all educational sectors in North Carolina. Without a single system-wide or statewide solution, individual schools, community colleges, and universities have no choice but to individually purchase commercial content or develop content on their own. Neither choice is logical nor realizes any economies of scale. Further, individual institutions have been purchasing or considering purchase of content repositories to serve their own needs without consideration of a larger concept that could enable multiple institutions to share content, thus drastically reducing the duplicative costs of content development—an expensive undertaking. In addition, individual institutional contracts waste valuable public funding when all institutions in a system could be served via a consortium contract. The total effect of a shared, system-wide learning object repository would be a repository “on steroids” in which individual content collections could be shared, commercial content could be obtained more economically, the quality of content could be enhanced and maintained, and total IT support and hardware costs could be drastically reduced. Thus the concept of the NCLOR is to 1) expand access to learning content to all students regardless of age or locale and 2) establish a cost-effective, client-centered, and user-friendly solution that is fully compatible with existing learning technology.

The North Carolina Learning Object Repository (NCLOR) is designed to be a repository of digital learning content that will be accessed and utilized by all PreK-20 educational institutions in North Carolina. NCLOR is a resource that realizes economies-of-scale savings in all categories and is designed to:

- Centralize hosting to reduce costs of hardware and IT support at member institutions;
- Provide capability for instructors to share Learning Object (LO) items;
- Provide capability for newly developed LO items to be peer reviewed, improved, deployed, and shared;
- Reduce duplication of effort and save development resources statewide;
- Be course management independent and avoid proprietary vendor lock-in;
- Provide entry into NCLOR via CMS/LMS logon (one point of authentication);
- Provide the ability to set permissions for client populations;
- Provide report capabilities; and
- Conform to standards governing content, protocol, and federation.

The barriers to a system-wide or statewide Learning Object Repository (LOR) are significant. Funding must be available throughout a long development process that, in the case of the NCLOR, included development of an RFP, selecting a vendor, and negotiating an agreeable contract. In 2006, when the project began, no solutions existed that were structured to meet the specific requirements of NCLOR, and no personnel in North Carolina had experience in a similar project of this scope. While there was ample “spirit of collaboration” within the NCCCS and with our educational partners, the “disruptive” aspects of the technology and perceived threats to individual “silo-centric” institutions were problematic. Lastly, the State of North Carolina implemented a Project Management requirement for all major IT projects that, while

extremely successful in the ultimate outcome of the NCLOR, created initial confusion and additional layers of approvals, as the Project Management process was being established while the NCLOR was created. The process took much longer than anticipated. However, the NCLOR was one of the first large-scale projects to benefit from the enterprise-wide project management initiative.

LOR technology is an ideal fit for the NCCCS. Implementation of this technology was determined to be a low “risk” due to a remarkable collaborative culture stemming from 1998, when the NCCCS Virtual Learning Community (VLC) was created. The VLC was a “brokered” process of developing online courses and learning resources. The System Office was the broker, providing funding, leadership, and coordination for Development Centers that were charged with developing online courses and resources. VLC Development Centers were responsible for developing a predetermined list of courses that, when completed, were made available to all 58 NCCCS institutions. Courses targeted for development were determined by student demand and system-wide need to provide complete associates degrees online.

The VLC, as originally conceived, had limitations. Once developed, VLC courses were quickly modified by community college faculty as individual instructors adapted the online course “templates” to their use. However, existing technology limited the capacity to identify and share these improvements in a systematic process. VLC online course development was a one-way street. Major improvements by faculty rarely found their way back to the VLC for subsequent online course updates and improvements. Moreover, the VLC was originally intended to develop learning resources that could be used in both curriculum and continuation education courses. Online courses were not good candidates for dual use. Without learning modules, continuing education course development did not keep up with that of curriculum courses. Establishing online associate degrees was a high priority for the NCCCS, and sufficient funds were unavailable to focus on both curriculum and continuing education.

The NCCCS now “owns” over 230 curriculum and 50 continuing education online courses, all developed by the VLC. Now that the NCLOR is a reality, VLC Development Centers concentrate on development of online modules rather than complete online courses. Development of modules, or Sharable Learning Objects (SLOs), offers a much more cost-effective means to produce online learning content. SLOs can be used collectively in complete courses, used independently to construct new learning modules, and/or be used in totally different curriculum or Continuing Education courses.

Funding became available in 2006 through the 2+2 Initiative, which focused on developing online learning resources to address the state’s teaching and nursing shortages. The 2+2 Initiative was also a partnership between NCCCS and UNC. The NCCCS provided freshman and sophomore online resources, while UNC provided junior and senior level resources. Thus, collaboration within the two systems was encouraged.

From March 2006 through the present, a “Leadership Team” composed of NCCCS, University of North Carolina System, and NC Department of Public instruction have met to plan, implement, and expand the NCLOR. The Leadership Team integrated into the NCLOR recommendations from the North Carolina e-Learning Commission established to improve e-learning access and opportunities across the state. These recommendations collectively support a Pre-kindergarten to grade 20 (PreK-20) emphasis including:

- Providing e-learning opportunities to all North Carolina residents, regardless of age and location;
- Providing uniform, robust learning resources to all educational institutions;
- Providing centralized learning resources on the state’s broadband network;
- Providing economies-of-scale savings in design of future e-learning products and services;
- Leveraging combined purchasing power to negotiate more attractive contracts with e-learning vendors; and
- Creation of the NCLOR as a PreK-20 statewide resource.

The NCCCS is committed to providing robust learning technology solutions to all community colleges programs, courses, and students in a manner that realizes all economies of scale. The NCCCS explores learning technology solutions based on a set of business requirements. A complete list of these and NC e-Learning Commission recommendations that impact NCLOR can be accessed at the bottom of the page at <http://vlc.ncccommunitycolleges.edu/about/links.asp>.

A key component to the development of the NCCCS LOR Project is the adoption of technical and procedural standards established by the Southeastern Regional Education Board (SREB) in their Sharable Content Object Repositories for Education (S.C.O.R.E.) Standards Initiative. The long-term goal of the SREB S.C.O.R.E. Initiative is to establish “federated” LORs in the Southeastern member states that allow convenient access of digital learning content to all member educators and students across the region. An SREB document, the “Principles of Effective Learning Objects,” describes the S.C.O.R.E. project and can be found at <http://www.sreb.org/programs/EdTech/pubs/PDF/PrinciplesEffectiveLearningObj.asp>.

NCLOR conforms to all federation standards established by S.C.O.R.E., which ensures that NCLOR can effectively partner with other statewide LORs to take consortium agreements and collaboration to a regional or national level. Thus, savings in SLOs development can be magnified exponentially.

D. Significance to the improvement of the operation of government

NCLOR now houses over 5,400 individual content items and is composed of many “collections” of content. Collections include commercial content from the Monterey Institute, departmental collections from the Duke University School of Nursing and the Horticulture Department at NC State University, VLC Development Center collections, and individual instructor contributions. The Virtual College Center, the first “affiliated” LOR in NC, houses a collection of 3-D content and is managed by Fayetteville

Technical Community College. Guest access to NCLOR is available at <http://www.nclor.org/>.

E. Benefits of the project

NCLOR is designed to serve the needs of PreK-20 education in North Carolina. All economies of scale were considered in the planning and development process. Representatives from all NC educational sectors participated in creation and development of NCLOR from inception to production. A unique and serviceable set of “business requirements” was developed to guide NCLOR development. The NCLOR is designed to:

- Enable cost-effective development, access, and use of Sharable Content Objects (SCOs), as these learning objects can be shared among colleges and 2+2 educational partners.
- Reduce development, editing, and update costs of online courses, as SCOs can be updated individually—they reside on an LOR and are only “pointed to” from CMS courses.
- Enable the Virtual Learning Community to easily create new and edited VLC online courses in multiple CMS formats. This enables NCCCS institutions to contract with more cost-effective CMS vendors or migrate to open source solutions.
- Catalogue SCOs using schema of metadata terms (dictionary of search terms) as determined by NCCCS academic administrators, instructors, and librarians.
- Once catalogued SCOs can easily be identified through search of the LOR and immediately used as needed.
- SCOs can easily be assimilated into CMS online courses.
- Multi-repository levels enable individuals and/or groups to develop SCOs and make them available for peer review or evaluation by an accrediting body. Accredited SCOs can then be made available for deployment according to appropriate rights and privileges.
- All SCO items have copyright and intellectual property and digital rights management capability.
- All SCO items can be assigned a variety of appropriate permissions levels.

To estimate the project budget and fiscal benefits, NCCCS compared the total cost of ownership of using the CMS vendor’s LOR solution with that of an independent LOR.

The NCCCS has a system-wide contract with a vendor to provide Enterprise online Course Management System (e-CMS) software. While this software is robust, it is proprietary, expensive, and does not comply with the business requirements of NCCCS.

The current CMS vendor does provide LOR-type technology, but at high costs. The CMS vendor’s LOR solution would add another \$4,281,450 to the current contract for 2007-2010. In addition, the CMS vendor’s proprietary LOR is not compatible with other CMS systems used in the NCCCS or with Campus Cruiser, its enterprise web portal platform. Further, system-wide sharing of SCOs stored in CMS vendor stand-alone systems is not possible at this time.

An alternative to the CMS vendor's LOR was the independent LOR solution. NCCCS selected The Learning Edge as the vendor to provide NCLOR software. Costs of a system-wide license, customer support, maintenance, hosting and hardware from 2007-2010 are \$1,485,690—a substantial savings of \$2,795,760 over the CMS vendor's solution. The independent LOR solution also works with the CMS vendor's enterprise course management system.

Additionally, LOR utilization will save instructors development and utilization time whenever they work with an online, hybrid or web-assisted course. Currently, courses are modified one at a time; batch processes do not exist for large scale upgrades. However, with an LOR, modification of a sharable content object can result in instant, simultaneous update of all online courses in which that object is used. Time saved is multiplied by the number of courses affected.

In 2007-08 the NCCCS Data Warehouse recorded 245,000 online curriculum course registrations. A registration represents one student taking one 3-semester-hour curriculum course, or one "duplicated head count." For 245,000 course registrations, this translates to 11,136 course sections (determined by dividing the average number of students in curriculum sections [22] into the total registrations in courses using CMS technology). A savings of five hours per course section (a conservative minimum projection) yields 55,680 total instructor hours saved. Based on an hourly rate of slightly over \$25 for a typical instructor's 9-month contract (\$40,000 divided by 1,560—an index number set by the NCCCS Finance & Business Division), the NCLOR provides an annual cost avoidance of over \$1,392,000. Furthermore, we anticipate a reduction in administration time required to manage CMS courses as transition to combined e-CMS/LOR occurs. A single hour of administration saved per course translates to 11,136 hours per year. Using the same hourly rate as above, administration annual cost avoidance would equal \$278,400. Combined, these estimated reductions of instructor and administrative time yield annual savings of \$1,670,400.

NCLOR costs

• Total Budget to Implement	\$1,110,000
• Actual (fully loaded) Cost to Implement	\$ 965,700
• Total Savings to Implement	\$ 144,300
• Actual Cost	
▪ FY0607	\$ 80,930
▪ FY0708	\$ 243,850
▪ FY0809	\$ 640,920
▪ Actual Cost to Implement	\$ 965,700
• Projected FY0910	\$ 600,920
• Projected total Cost of Ownership (Implementation + 5 years)	\$ 2,632,600