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“No major
changes had
been made to
how we present

curriculum materials to
students in the past 5
years. New demands
and new technological
capabilities required we
find a new method to
deliver content. Zope /
Plone offered the
flexibility we needed at
a low cost. CIGNEX pro-
vided the expertise to
put our ideas into
action.”

Eve Juliano

Director of Educational
Technology Group
UNC-CH SOM



Defining and delivering a flexible, web-based Curriculum Management System for the UNC School of Medicine

Key Business Results Delivered by CIGNEX

Improved the
quality of
online course
content

Streamlined
the content
development
process

Facilitated
tracking and
notification of
curricular
changes

Enabled a
low-cost,
easy-to-main-
tain school-
wide curricu-
lum system

Leveraging open source to deliver education

Curriculum management determines the preparedness of academic institutions to use technology to further education. It reflects the quality of education delivered by the institution—its ability to communicate and collaborate; to serve as a knowledge dissemination platform; and to manage digital learning resources. In a globally distributed world, Web-based systems enable 24-hour access and facilitate development, delivery, reporting, and assessment. Curriculum-management systems facilitate delegation of tasks, empowering faculty staff to manage classes and course content.

UNC School of Medicine

Established in 1879, the University of North Carolina School of Medicine (UNC SOM) is a top-ranked public medical school that excels in both extramurally funded research and the development of physician practitioners, whether in primary or specialist care. It has a highly regarded medical education program, postgraduate and residency programs, a distinguished faculty, and top-ranked clinical and basic science departments. The school's annual expenditures are approximately \$648 million (2004); its trainees include 640 medical students, 650 residents and clinical fellows, 500 basic science graduate students, 300 post-doctoral fellows/students, and 250 allied health sciences students; and it employs more than 1,200 full-time faculty and roughly 2,750 professional nonfaculty and staff employees.

UNC-SOM's Predicament in its Curriculum Management

Inefficient content management—The school used multiple tools to create content, a scenario that often led to broken links and integrity concerns. Creating content involved manually embedding text in 2000+ pages and interlinking them later. This process was inefficient and error-prone, and managing changes to content was time-consuming. Content delivery, via e-mail or CD, lacked a workflow to move content between site adminis-

trators, course managers, and faculty staff.

Inadequate infrastructure—Managing an ever-growing number of digital learning resources had become very difficult at UNC SOM because of inefficiencies in the process. Delivery of digital learning resources took anywhere from a few hours to a day, and the resources had to be physically transported (to the managing staff) because of e-mail attachment restrictions.

Dissatisfied user base—The school has been witnessing an increasing push from students and faculty to offer an on-demand publishing system that accelerates the content-delivery process. Students have begun to expect learning materials to be made available with each course. Faculty staff demands a system that is innovative and flexible, on par with high-end systems and responsive to their ongoing needs. The staff demanded flexibility with publishing content, like having draft mode and specifying a finite time span for content.

High maintenance costs—The school has made an effort to maintain the user interface for all SOM courses by manually maintaining the system. The inherent way of mixing content and presentation not only leads to a diluted online presence but also presents several maintenance problems. The school was incurring high costs resulting from manual maintenance of a static system running on proprietary, monolithic servers.

CIGNEX enables University-wide Curriculum Management Changes

CIGNEX's overall solution mandate encompassed the following:

Role-based security framework—CIGNEX pro-



vided UNC SOM with a membership system, integrated with the school's existing central LDAP repository that enabled the assignment of roles and responsibilities to different departments/individuals for various sections of the Website.

Content-management system (CMS) framework—The CIGNEX Content Management Solution is based on the open-source Zope/Plone CMS platform. The solution empowers subject matter experts to easily manage the lifecycle of course content, from planning to creation to delivery.

Workflow and process management—Role-based permissions and workflows were incorporated to facilitate content creation and publishing based on policies and best practices. This ensures that the content being created and delivered is interrelated, leading to improved course quality.

Extendable framework—CIGNEX's Plone framework helped UNC SOM add new content types to manage the delegated management of digital learning materials. The solution provided an integrated calendar add-in that supports posting of upcoming courses, and facilitates easy viewing of courses and topics by enrolling students.

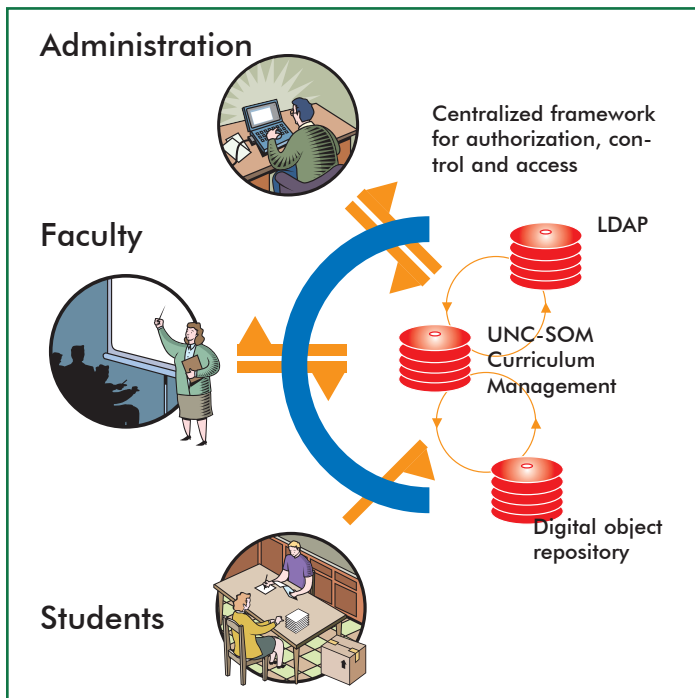
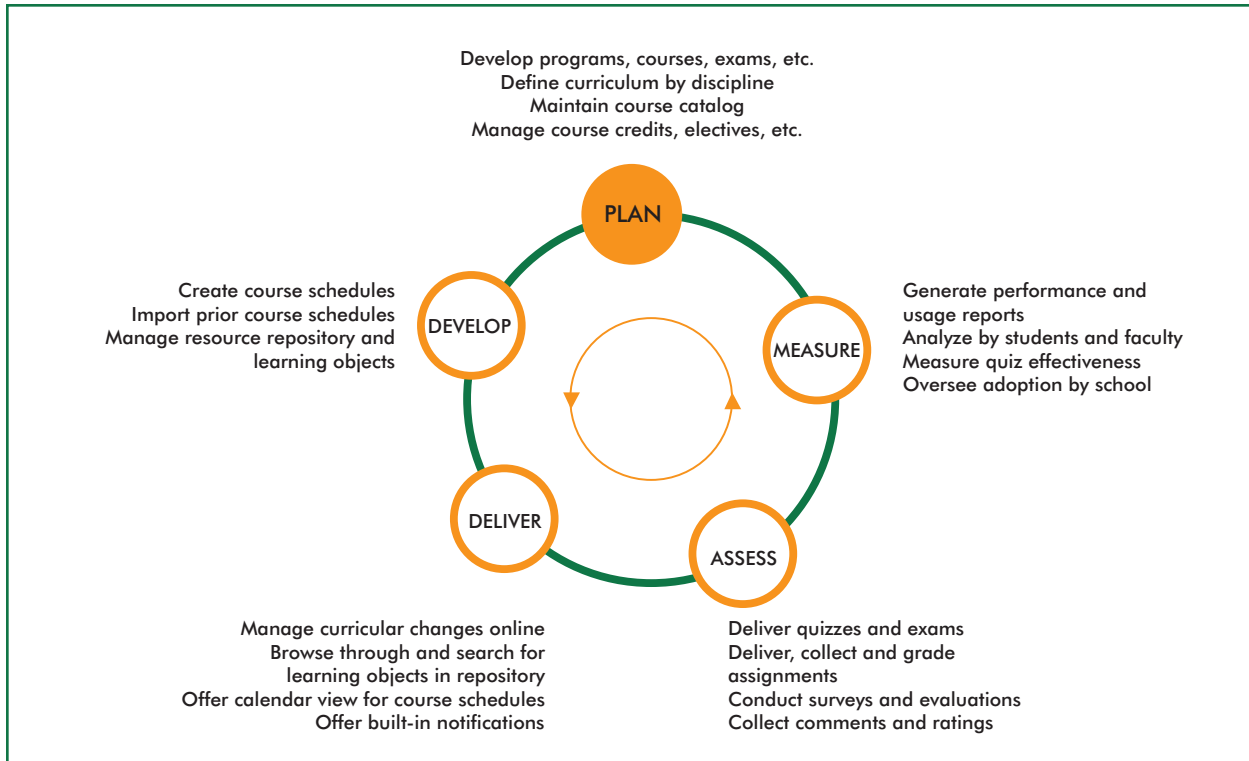
UNC SOM Benefits

Improved content quality—Built-in checks and balances for content authoring and publishing help curriculum staff determine appropriateness and completeness of content without gaps, overlaps, or redundancy. Building the solution on top of a CMS framework facilitated easier management of curricular changes and provided a uniform design for the entire course content, easing the rate of adoption by faculty and students and improving satisfaction.

Centralized access management—The CIGNEX solution lets administrators centrally manage user access across the entire lifecycle of content, while allowing delegated administration of some components to decentralized users based on university standards. Intuitive and configurable roles-based management helps administrator and faculty staff manage their content and curricular management objectives through one interface.

Increased turnaround times—Streamlined content

Lifecycle of Curriculum Management



Decentralized architecture with centralized user access

publishing and delivery processes have resulted in time savings of 2 to 4 hours a day. Site administrators can easily do "course rollover," simplifying the process of creating a course from prior years. Courses can be scheduled for automatic display and removal, enabling faculty staff to create content ahead of time and better manage their backlogs.

High return on investment (ROI)—The solution was developed using open-source technologies, which are platform-neutral, affording possible integration with existing systems. UNC SOM incurred the lowest possible cost while generating high ROI. In addition, the content-management framework (CMF) was developed and set up in a manner that is easy and cost-effective for UNC SOM to maintain.

ABOUT CIGNEX: CIGNEX is an industry leader in providing open-source business solutions to the enterprise. The company has successfully implemented and deployed more than 50 open-source solutions in the healthcare, media, financial, high-technology, insurance, and academic markets. The company was founded in 2000 and has been profitable since inception. CIGNEX customers include Lawrence Livermore National Laboratories, Epson Electronics America, UNC Healthcare, UNC School of Medicine, OKI Semiconductor, Advantest America, and Quill Corporation. CIGNEX is based in Santa Clara, California, and is privately held. Additional information about CIGNEX is available at www.cignex.com.