

## **A. Summary**

### **Applying Advanced Distributed Teaching and Learning to Pre-Calculus Mathematics**

The University of Wisconsin Colleges (UWC)—13 two-year colleges in the University of Wisconsin System—with the University of Wisconsin-LaCrosse (UW-L) seek the collaboration of the NSF through its CCLI/Educational Materials Development program to 1) create a repository of shareable content objects (SCOs) targeting trouble spots in a typical pre-calculus course, 2) create training materials that will help faculty assemble these SCOs into instructionally effective modules, and 3) evaluate both this faculty development process and the resulting courseware.

This project serves as a nexus for two significant national efforts: the development of digital collections of instructional materials and the development and adoption of specifications and technology that support a "learning object" approach to authoring, delivering, and teaching with online content. We propose to apply this approach for the first time to a critical educational need (pre-calculus) and to develop the support needed for faculty to effectively use SCOs.

Funding of this proposal will result in four “products”:

- A repository of quality assured shareable content objects (SCOs) created from existing content contained in digital libraries.
- A workshop and associated material for supporting faculty use of this repository.
- Modules assembled from SCOs that address critical concepts in a typical pre-calculus course.
- A set of workshop materials that explain and simplify the technical process of creating SCOs.
- A documented set of best practices for using SCOs, along with a plan for national dissemination of both the resulting course material and the faculty development program.

Fifteen veteran faculty members from the two institutions will serve as instructional teams. Working with a process developed by MERLOT, they will gather and assess materials -- from MathForum, MathDL, ENC, and other digital content sources—for use in the creation of several learning modules that address critical points in pre-calculus education and exemplify the SCO model of reusability. Once developed, these modules will be tested in the instruction of about 30 sections of precalculus over the AY 03-04. Changes in student achievement and satisfaction will be compared with historical data and with data derived from a control group of faculty and students who have not been involved in the project professional development process.

Because this project is designed to examine a national dissemination model, its technological aspects are based on the Shareable Content Object Reference Model (SCORM) produced by the Advanced Distributed Learning initiative and based upon work done by international specifications and standards organizations. The Academic Advanced Distributed Learning Co-Lab, a project partner, and the senior project consultant have each provided national leadership for academia in the project area.. SCORM is being rapidly adopted internationally as a content interchange standard which will ensure that all materials created by the project will be useable by any learning management and learning content management systems, unlike materials generally found in digital repositories. This technology is designed to support a world in which instructors can find and use high quality components when creating new content, allowing them to spend time on instructional and design aspects instead of on authoring everything from scratch.