

CAMPUS TECHNOLOGY

The Evolving Growth of LON-CAPA

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As educational institutions establish an online presence, initial successes are often due to individual faculty members (“early adopters” of this new technology), working long hours to develop material more or less single-handedly. Frequently, they are leaving behind scattered projects, which are of intrinsic value, but of little use for the institution and far less for the larger academic community. The same is frequently true for content developed in externally funding curriculum development projects, where stewardship for the materials oftentimes ends with the end of the funding period, and little or no sustainable dissemination strategy is in place. “Late adopters” of technology in education might altogether refuse to venture into creating new online educational resources, since the task of creating comprehensive material appears overwhelming in isolation.

To address these problems, an infrastructure to provide a course and learning content management system was created, which has resource sharing at the base of its architecture: the LearningOnline Network with Computer-Assisted Personalized Approach (LON-CAPA).

The roots of this system go back to 1992, when a group of faculty at [Michigan State University](#) started developing a sophisticated online homework and assessment system, with a strong focus on the sciences and mathematics. Soon other universities adopted the system, and it was not long before an informal culture of inter-institutional sharing of such resources developed. The exchange of resources, however, was reflected nowhere in the architecture of the system, and was achieved by copying files (at the time, on floppy disks), FTPing them from server to server, or e-mailing them from colleague-to-colleague.

To formalize and thus further the content sharing within the emerging community of practice, the team in 1999 started to add cross-institutional digital library and learning content management capabilities, which were not limited to problem resources, but include the management of any multimedia materials (images, HTML pages, applets, etc). The top layer of the system consists of a complete course management system, so that the assembled resources can immediately be used in a course context, where instructors have the ability to seamlessly assemble their course from resources across institutional boundaries.

In 2000, the LON-CAPA group at MSU received funding by the [National Science Foundation](#) to expand the user community, research educational effectiveness of the resources, and to develop a mechanism for resource sharing across institutional boundaries and with the collaboration of commercial partners. In 2003, the project won the Computerworld 21st Century Achievement

Award in the Education and Academia category, and in 2004 it won a Sloan-C “Most Effective Practice” Award.

Today, LON-CAPA spans 37 universities, 4 community colleges, 44 high schools, 3 middle schools, 6 content development projects, and 6 publishing companies. LON-CAPA is serving over 11,000 students per semester at MSU alone, and well over 30,000 students per semester system-wide.

Its shared resource pool currently holds around 247,000 resources, among those are approximately 80,000 original homework and exam problems, 88,000 images, 700 movie and sound files, 1,500 animations and simulations, 58,000 content pages, and 7,400 re-usable content assemblies. Disciplines include astronomy, biology, business, chemistry, civil engineering, computer science, family and child ecology, geology, human food and nutrition, human medicine, mathematics, medical technology, physics, and psychology.

With all the tools in place to share content across multiple institutions and deploy them, and the majority of the content published such that it can be reused anywhere across the network, the real question is: does it happen?

As it turns out, of the 247,000 resources available in the pool, a little more than one third (36 percent) are in active use, where active use means being used recently in at least one course at the participating institutions. Of those, 44 percent are used in at least one course at an institution other than the institution where they originated. In other words, 15 percent of the available resources in the pool are shared across institutional boundaries.

These percentages vary strongly by resource type: the percent of active use is the highest for problems, where 72 percent of the available resources are used in courses, and of those, 41 percent across institutional boundaries – 30 percent of the available ones. Active use is the lowest for HTML content pages. Images are mostly reused in connection with problems or HTML pages – on the average 0.64 images per problem/page.

Most resources that are in active use are on the average used at 2.07 institutions, but as it turns out, this also varies by resource type, with, for example, animations and simulations being used on the average at 3.41 institutions.

This year, the LON-CAPA Academic Consortium was founded with Michigan State University and the [University of Illinois at Urbana-Champaign](#) as founding partners. Through this consortium, stewardship of the resource pool and the system infrastructure will be shared across institutions, and the financial sustainability of the project is guaranteed through long-term financial commitments of the partner institutions.