

Multimedia use reinvigorates the classroom experience

by Stephen Bleezarde

Before Gutenberg and the printing press made modern textbooks possible, teaching took place through lectures and Socratic dialog between teacher and student. Printed materials didn't eliminate that dialog, or the need for lectures, but they did revolutionize teaching.

In Princeton's classrooms, another revolution is taking place. Some professors are redefining how they teach by using new computing applications developed by a team of programmers in the School of Engineering and Applied Science (SEAS).

The programmers belong to the Multimedia Engineering Computation Atelier (MECA). They are developing applications that include web-based simulations and multimedia databases that provide new ways for students and teachers to access information.

Like textbooks, these new technologies are available outside the classroom and provide students with access to more information than can be presented in lectures alone.

Unlike textbooks, these web-based simulations and multimedia databases are highly customizable and can be tailored to a professor's individual needs.

"Simulations are great for teaching," said **Kirk Alexander '72**, manager of MECA. "With a simulation you have a mathematical model and algorithms to define what happens—and this isn't discipline specific. You can simulate power plants, or automobiles, or abstract equations. With tools that work this way, demonstrations can follow classroom discussion. Teachers are not locked into one scenario; they are free to explore the possibilities with their classes."

Since becoming part of the SEAS in 1996, MECA has collaborated on projects reaching students in dozens of classrooms, in fields ranging from chemical engineering and art history to ecology, evolutionary biology, and comparative literature.

Chemical Engineering Professor **Yannis Kevrekidis** is one of the first professors of engineering to capitalize on this added dimension to teaching.

Collaborating with MECA, Professor Kevrekidis produced an interactive graphing

tool that allows students to model, animate, and explore complex dynamic equations online (see related story on page 9).

The development of this new generation of teaching tools is made possible by the speed of affordable PCs and the versatility of applications that can be used on the web. Nonengineers, and even inexperienced computer users, can take advantage of these powerful classroom tools by using the simple web interfaces MECA personnel have built into the applications.

When Art and Archeology Professor **John Pinto** decided to develop a database for Art 320: *Rome the Eternal City*, he turned to MECA. The result, the Nolli project, placed Giovanni Battista Nolli's famous 18th-century map of the city into an online database and created a new way to study the map and the city. Buildings and monuments are linked to a rich collection of paintings, photographs, histories, and literary references.

"The technology allows students and teachers to approach research and instruction in a new way," Professor Pinto said. "For years I've shown students this map, but the static image wasn't alive. You couldn't manipulate it.

"Having it online means that the students can virtually walk down an 18th-century street. By clicking on monuments, they can pull up not just textual information but images showing the buildings as they appear today and as they appeared in the past."

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Janet Temos, graduate student of art and archaeology, John Pinto, professor of art and archeology, and Kirk Alexander, manager of MECA, review the Nolli map of Rome.

Photo by Jon Roemer



Professor Pinto said the online database has two primary benefits: Students are able to independently explore material, and he is able to spontaneously respond to questions.

"This project gives students a significant

measure of control and personal investment in the learning process that wasn't there before," Professor Pinto said. "In the past I would bring a limited number of slides into class to prompt discussion, but questions would always arise about something I hadn't brought a slide along for. Now I can call into the database and pull up any image I want. To address a question from the class in real-time, rather

than bringing that slide to class the next week, is a tremendous resource for any instructor."

Michael Curschmann, professor of Germanic Languages and Literatures, has used another database tool MECA staff helped develop, called Mappamundi, to instruct students of Medieval Studies 227: *The World of the Middle Ages*.

This database contains mixed media from several disciplines and makes it possible for Professor Curschmann to combine and interrelate images from "between 250 and 300 slides," and a "small mountain of data," formerly distributed in handouts.

His experience developing and using Mappamundi has made professor Curschmann an

advocate of technology in the classroom.

"Until I became involved in this project, I had not even touched a word processor, let alone a serious computer," Professor Curschmann said. But with MECA's partnership, he participated in the design and implementation of a tool that improves his ability to teach—without demanding that he become expert in the technical details.

"One of the most beneficial effects of this program is that it unclutters the classroom and gives the teacher a chance to do what he or she does better than the computer, namely teach—no more scribbling on the blackboard, no more unwieldy handouts," Professor Curschmann said.

"This is not meant to be a computer-age version of show-and-tell, a substitute for good classroom teaching, or for other forms of guidance through the learning process. The idea is not to make teaching easier for me, or to eliminate me altogether, but to make me a better, more effective teacher."

Providing effective and innovative teaching tools requires a team like MECA, Mr. Alexander said, because such specialized software doesn't exist anywhere else.

"Commercial software isn't available to do what we're capable of doing with the hardware," Mr. Alexander said, "especially in teaching. Commercial programmers are trying to build the next big moneymaker; they are hoping to compete with Microsoft, and they aren't asking the kinds of questions that are going to help in the classroom."

Exposing students to these new technologies is an important benefit to developing cutting-edge software for the classroom.

"If we're teaching the way everyone else is teaching, we aren't doing Princeton students any kind of service," Mr. Alexander said. ♥

Additional information about MECA and the projects mentioned in this story can be found on the web at: <http://meca.princeton.edu>.

Kirk Alexander, left, manager of MECA, discusses multimedia capabilities at a recent MECA open house.

Photo by Stephen Bleezarde



Hold the date!

Graduate Reunions this year—May 27 through May 30, 1999—will feature the School of Engineering and Applied Science. Departments within the School are planning a variety of presentations. Reunions festivities planned by the APGA Reunion Committee

include: Friday night graduate student-alumni mixer, Friday evening program, Saturday luncheon and P-rade, and Saturday night awards dinner. The schedule can be accessed at: <http://www.princeton.edu/~alco/gradalum/reunions/reun99.html>.