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California State U. Learns to Rely on Online Remedial-Math Courses

BY FLORENCE OLSEN

FRUSTRATED by large numbers of students who arrive unprepared for college mathematics, the California State University system has resorted to using commercial online courseware to help the students catch up.

So far, the interactive-multimedia-mathematics software is earning higher marks than the traditional classroom courses it has replaced, says Sheryl O'Neill, the coordinator of entry-level mathematics and mathematics placement exams for California Polytechnic State University at San Luis Obispo. "We found that students were learning and were able to move on," Ms. O'Neill says.

As one of the largest public universities in the nation, Cal State spends \$10-million a year to help its students succeed in college-level courses. When system officials reported dramatic improvements last year in the number of freshmen completing mandatory remedial courses, the board of trustees singled out the use of technology as one of the strategies that seemed to be working.

A Cal Poly study that tracked 271 students enrolled in a traditional precalculus course found, for ex-

ample, that the students who had previously completed an interactive online course in intermediate algebra were more successful in the precalculus course than the students who had taken intermediate algebra in a traditional classroom. The students who took the nontraditional algebra course earned 49 percent more A's, B's, or C's in precalculus than did the students who completed an algebra course in a traditional classroom.

"Not only have our pass rates gone up," Ms. O'Neill says, "but we also feel that our students are doing at least as well, and probably better, in their university-level courses" after taking the interactive online preparatory courses. Cal Poly officials have gained enough confidence in computer-mediated learning for students taking preparatory courses that the university now offers elementary and intermediate algebra courses only online.

A GROWING MARKET

Cal Poly acquired its interactive-multimedia-math courses from Academic Systems Corporation, a company that offers Windows-based CD-ROM courseware for

teaching math at four levels. Each of the courses provides about 70 hours of instruction. The company charges \$60 to \$80 per student per course, depending on the number of courses and students enrolled.

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ing the interactive courseware to help prepare students for college-level mathematics.

Some colleges elsewhere that are trying innovative ways of teaching math have developed their own courses. At Virginia Tech, for instance, instructors created their own courseware after finding few commercial alternatives suitable for their students.

Other companies in the interactive-mathematics-software market

include Prentice Hall Canada, which sells Prentice Hall Interactive Math; McGraw-Hill Companies, which makes ALEKS; and TRO Learning, which offers Plato Mathematics.

At Academic Systems, company officials say their best customers are community colleges. The company had expected to add trigonometry or calculus to its course offerings, which had previously included only elementary algebra, intermediate algebra, and college algebra. But demands from community colleges led the company to produce a basic-mathematics/pre-algebra course instead of a higher-level course.

SKEPTICAL INSTRUCTORS

Cal Poly offers the elementary and intermediate algebra courses to its students, who can complete the courses in the math lab, elsewhere on campus, or even at home. Working from home is a popular option, Ms. O'Neill says. "We think that's increasing the amount of time students are actually spending in the programs."

The university's mathematics instructors were less enthusiastic about Academic Systems' college-

algebra course, however. After a review, the instructors advised against using it, Ms. O'Neill says. They decided the software would not adequately prepare students for calculus, which is a required course for many Cal Poly undergraduates.

The Cal Poly instructors who work with students in online remedial mathematics courses are either graduate students or part-time faculty members, Ms. O'Neill says. For reasons unrelated to the adoption of math courseware, she says, the number of full-time math professors has dropped "drastically," meaning the remaining full-time faculty members are kept busy teaching college-level courses.

Even when online mathematics courses have as many as 50 students enrolled, as is the case at Cal Poly, instructors can keep close tabs on individual students' progress and on the progress of the class as a whole by using the reporting functions built into the courseware, Ms. O'Neill says. "It's a very different kind of role," she says, adding that "some teachers don't like to give up their star role."