

Course overhaul boosts student performance in College Algebra

By Tom Hockett

K

elli Craven is no fan of mathematics.

"I just have never been very good at it," she said. "I would spend hours doing the homework and then get all the problems wrong."

But the 22-year-old student at the University of Missouri-St. Louis has come around a bit. She credits a university initiative, which revamped College Algebra, with helping her to improve her math acumen, and outlook. "I am getting better. I don't hate it any more."

The initiative got under way in 2004, when the National Center for Academic Transformation, a nonprofit organization affiliated with Rensselaer Polytechnic Institute in Troy, N.Y., selected UM-St. Louis to participate in Roadmap to Redesign, a national program that's helping universities improve large-scale, introductory classes.

College Algebra is a prerequisite for many majors at UM-St. Louis, including business administration, elementary and secondary education, nursing, biology, physics and economics. More than 700 students take the class each year.

Fewer than half were passing, as recently as 2002.

"We had a high failure rate, and because the course is required for many of our students, the university was losing some of them," said Teresa Thiel, associate dean of the College of Arts and Sciences and coordinator of Roadmap to Redesign at UM-St. Louis. "It was a retention issue too."

UM-St. Louis is not alone in dealing with this kind of problem. According to NCAT, U.S. undergraduate enrollment is concentrated in a handful of academic areas. About 25 courses make up one-third of enrollments at four-year institutions. The center reports high failure rates (15 percent to 40 percent) in those courses, leading to "significant drop-out rates between the first and second year."

But with the structure and support provided by NCAT and Roadmap to Redesign, Thiel and UM-St. Louis math faculty set out to identify problems with College Algebra.



Shahla Peterman, senior lecturer in mathematics, says the old course model didn't give students enough practice solving problems, and the delay between turning in written homework and getting it back was too long.

"Homework questions and answers were not fresh in the students' minds," she said.

In the summer and fall of 2004, Peterman piloted course-delivery software packages. She eventually picked MyMathLab, a product from Pearson Education Inc. Students use the software, which can be accessed from any computer with an Internet connection, to complete tutorial exercises and homework.

And the weekly class schedule now consists of one 75-minute lecture and two 75-minute lab sessions. Under the old model, there were three 50-minute lectures and no lab time.

"The program largely has been about lecturing less and providing more hands-on learning," Peterman said. "Students now get homework results almost instantly. They're completing more problems, and it's on a daily basis."

For the most part, learning takes place during lab time at the new Math Technology Learning Center. Opened in October on the university's North Campus, the \$350,000 center features 130 networked computer workstations,

printers and a group study area. Faculty and teaching assistants staff the center from 8 a.m. to 6 p.m. Monday through Thursday.

Craven, the student, completed the course during the fall semester. She said teaching assistants are "extremely helpful" and the center is set up to encourage students to work together.


"If I was stuck on a problem, I had another student who sat near me," Craven said. "She and I would talk to see if we were having the same problem. We did a lot of work with each other."

Peterman reports significant increases in student performance. In the fall, the course pass rate reached 82 percent (a jump of more than 30 percent over 2002). Performance on the final exam also was measured. Using the same test, the average score in spring 2005 topped 80 percent. While two years earlier, that percentage was just above 60.

Peterman said, "Not only are more students passing the same final exam, more students are earning A's and B's for the course."

Craven was one of them.

"I got a B, actually," she said.

"This class was very different. I got the concepts better the new way." 

Shahla Peterman (right), a senior lecturer in mathematics at UM-St. Louis, tutors Reggie Vitale, a senior majoring in business administration at UM-St. Louis, at the university's Math Technology Learning Center. Vitale took College Algebra during the fall 2005 semester.