

# THE CHRONICLE OF HIGHER EDUCATION

## Diversity in Academe

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### Sharing Math's Appeal With First-Generation Students

*By Susan D'Agostino*

**T**wo years ago my university, a regional institution where one in three students is first in their family to attend college, did not offer a major in mathematics.

Instead Southern New Hampshire University offered numerous degree programs aimed at highly specific careers, including business, education, criminal justice, graphic design, culinary studies, and others. At the same time, many students had an aptitude and affinity for math. As our faculty, staff, and administrators designed a new bachelor's degree in math, we focused on a student-centered model that paid particular attention to recruitment and retention of students, including those who were first-generation college students.

These efforts have since led to an emerging population of undergraduate math majors in a setting where one did not previously exist. A devil's advocate might ask, Why? Why create new science, technology, engineering, or math (STEM) majors when so many universities—large flagship public universities as well as small private liberal-arts colleges—already have them? Also, why should first-generation students warrant special consideration in the development of a STEM major?

The most compelling reason for the new major is that regional universities like ours serve more first-generation students than do nonregional universities. Such students often transfer from community colleges, may have family responsibilities that impede relocation, or may be deterred from applying to more-expensive institutions. The large number of first-generation students drawn to regional universities should have the option of majoring in STEM subjects.

The most compelling answer to the second question—why first-generation students warrant consideration—is that they represent an untapped pool with potential to increase the quantity and quality of highly educated workers in areas of national need.

In developing our new math major, we were influenced by two reports: a 2008 report by the Pell Institute called "Moving Beyond Access: College Success for Low-Income, First-Generation Students," and a 2005 Education Department report called "First-Generation Students in Postsecondary Education: A Look at Their Transcripts."

The Pell report concluded that first-generation students were more likely than others to live off campus and work full time—factors that restrict integration and increase attrition rates—and were underrepresented among STEM majors. The Education Department report concluded that first-generation students were less likely than others to identify a major upon entering college, and more likely to ultimately major in a vocational or technical field.

If STEM faculty members do not take the lead in identifying and nurturing latent STEM talent among first-generation students, who will?

**D**eveloping an inclusive math major has been a work in progress. Initially our team determined that it was necessary to challenge our campus culture, which has historically dictated that a major should direct students toward a specific career. Thus the launch of our program included an awareness campaign alerting students to a range of career and graduate-school options in math.

The most successful of our efforts was a panel featuring an international business executive, a high-tech entrepreneur, a high-school teacher, and a mathematics graduate student, all of whom had been undergraduate math majors. We then encouraged students from our general-education math classes—where many undeclared first-generation students find themselves—to attend. The standing-room-only event created a buzz on the campus for

weeks and succeeded in converting numerous undeclared students—a large number of whom were first-generation—into math majors.

Because first-generation students do not always self-identify as mathematics majors, we developed an internal recruitment strategy to identify them. Once each semester, just before registration, mathematics faculty members conduct short visits to all entry-level math courses. We promote our forthcoming course offerings, taking time to explain why courses with unfamiliar names like "differential equations" or "regression analysis" are interesting and worthwhile. And we promote our math minor, which is an effective gateway program for the major. We also visit a number of upper-level courses, as well as math-related courses (like statistics) that could lead to a math major.

As a result, all of our new, upper-level math classes have robust enrollments.

**W**e promote the major as a package deal so that interested students, who may not have thought of majoring in math, will feel supported.

More than a collection of challenging classes, our mathematics program offers a highly social Math Club, potential paid employment as math tutors, well-attended faculty office hours, and career counselors who are eager to place majors upon graduation.

At the same time, we are honest about the rigor of the mathematics major. We state point blank that the math major is not for everyone, and that we are looking for a few curious individuals who are not afraid to work very hard.

Anecdotally, the rigor of the math major appears to be more of a selling point for first-generation students than a deterrent. That is, while first-generation students may not always self-identify as math majors, they do respond positively to challenges that demand a solid work ethic. Many come to see math as an endeavor that garners respect from peers, parents, and the larger

world. When students possessing a solid work ethic and an eagerness to prove themselves sign up as math majors, we are grateful to have them.

The opportunity for students to work as math tutors, staffing the "walk-in hours" and serving as one-on-one tutors in our Learning Center, has been a particular boon to fostering inclusiveness in our major.

Because some first-generation students are inclined to see themselves first as workers and only second as students, tutoring jobs help blur the boundary between employment and academics. Math tutors are trained and encouraged to earn certification through an internationally recognized tutor-training certification program.

Our Math Tutoring Coordinator works closely with the mathematics faculty to identify prospective tutors so that both tutors and tutees, and by default the entire program, will benefit. Occasionally, it happens that one first-generation student tutors another. We have not yet run the numbers, but we conjecture that such interactions have a positive influence on the retention and persistence rates of both students.

We are only at the beginning stages of developing a new STEM program that is fully inclusive of first-generation students. We still want to provide financial aid directly aimed at first-generation math students, develop a math alumni base that may serve as a network for current students, educate more current students about math internships and paid research opportunities, and much more. However, daunting as our extended list is, we are more often bolstered by our emerging population of math majors—now 27 strong—and nearly 50 math minors, many of whom are considering becoming majors.

Just recently I heard a math major call out to me as students bustled through the hallway between classes. "Hey professor!" he shouted. "I'll see you at your office hours later today! A bunch of us will be there! It's going to be a calculus party!"

It was all I needed to hear.

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Some details as to the program's structure would be helpful.

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