The National Center for Academic Transformation

Does A Nursing Student Really Need to Solve Rational Equations?

by
Carol A. Twigg

In a recent study funded by the Gates and Hewlett Foundations, Rhonda Epper and Elaine Baker summarize the spotlight that is now focused on developmental math across the nation. "In the past five years, the critical role of developmental math in the retention and success of community college students has come under additional scrutiny, partially through the attention and resources of national initiatives. This attention has been accompanied by several research efforts in developmental education and a parallel policy focus on the implications of this research for higher education policy. . . . The combination of interest from foundations, public policy groups and researchers who view math as the gatekeeper to college success have yielded a variety of new strategies and programmatic innovations, with a parallel focus on evaluating and assessing the promise of these strategies in terms of replication, scalability and sustainability."

As readers of this newsletter know, NCAT advocates redesigning the developmental math sequence using the Emporium Model to improve student learning outcomes while reducing instructional cost. Over the past ten years, NCAT redesigns have, on average, increased the percentage of students successfully completing a developmental math course by 51% and reduced the cost of instruction by 30%.

For those institutions that do not want to take on a full redesign project, however, two relatively simple actions could be taken that would dramatically reduce the number of students enrolled in developmental math. (Institutions planning a redesign should also consider these ideas.) These two ideas emerged during NCAT's collaboration with the Tennessee Board of Regents (TBR) in its Developmental Studies Redesign Initiative, most specifically from the award-winning redesign project at Jackson State Community College (JSCC).

Since the early 1980's, the TBR has operated a remedial and developmental math program comprising three courses: Basic Math, Elementary Algebra, and Intermediate Algebra. These three courses are offered at all 13 TBR community colleges, helping to ensure a consistent experience for all TBR students regardless of location.

The TBR program also uses a uniform placement testing system. Students are placed in a remedial or developmental course if their ACT/Compass math subject scores are less than 19 or 29 respectively. Using ACT as an example, if students score 17 or 18, they are placed in Intermediate Algebra; if students score 15 or 16, they are placed in Elementary Algebra; if students score 14 or less, they are placed in Basic Math. Students are required to progress through one, two or three courses on a semester schedule until they exit Intermediate Algebra. Only then can they enroll in college-level math courses or their desired programs of study.

Remediating High School Deficiencies vs. Preparing Students to Succeed in College

As part of the redesign initiative, the TBR asked institutions to reconsider what the goals of remedial/developmental education should be. Specifically, they asked, Are you remediating high school deficiencies in your remedial/developmental courses or preparing students to succeed in college?

JSCC recognized that student goals are different: they may plan to enter a program of study that requires advanced mathematics, to complete a general education mathematics course or to apply for admission to a nursing or allied health program. Consequently, JSCC's redesign moved away

from remediating students' high school algebra deficiencies to preparing students for their particular educational goals. Students were required to master only the concept deficiencies that were relevant to their educational and career goals.

When JSCC redesigned the three remedial and developmental math courses, they replaced them with 12 clearly defined modules mapped to the competencies originally required in the three courses. Courses were divided as follows: Modules 1, 2 and 3 for Basic Math; Modules 4, 5, 6 and 7 for Elementary Algebra and Modules 8, 9, 10, 11 and 12 for Intermediate Algebra.

After defining the competencies to be included in each of the 12 modules, the JSCC math faculty determined which modules were necessary to succeed in each college-level general education math course. All other departments identified which modules were necessary to succeed in their college-level courses as well as their discipline's core math requirements. Departments with programs not requiring college-level math determined the modules necessary to succeed in those programs. Changes in developmental math prerequisites were approved by the college curriculum committee.

Of the 48 programs of study at JSCC requiring college-level math courses, 35 required only seven modules (47.1% of the students); four required eight modules (31.2% of the students), and seven required all 12 modules (20.3% of the students). One program required only six modules (0.8% of the students), and one required only four modules (0.6% of the students).

Students were advised of their multi-exit opportunities based on their program of study choice and of the need to take more modules if they later changed their majors. This was accomplished via information sheets for each major, focus-group sessions and individual counseling with math instructors and the students' academic advisors. The team made a campus-wide presentation at an in-service training and conducted sessions for advisor training in order to educate the college faculty and staff.

By changing the requirements for developmental math completion, JSCC should be able to reduce the number of sections/modules they needed to offer by 31%. As an example, during the 2008-09 academic year, 1836 students were enrolled in developmental math courses. JSCC needed to offer the equivalent of 15,241 modules to serve these students under the new policy. Assuming similar placement distributions, JSCC would have had to offer 22,032 modules under the old policy.

ACT studies show that 80 to 90% of students need an assortment of skills from Basic Math, Elementary Algebra, Geometry and Statistics to succeed in college-level math courses, and they do not need as much Algebra as the traditional remediation approach provides.

Are you looking backward or forward? Are you remediating high school algebra deficiencies in your remedial/developmental courses or preparing students to succeed in college? Are you preparing <u>all</u> students to succeed in STEM majors, even though most will not major in a STEM field?

Including College-Level Content in Remedial/Developmental Courses

After the first full year of implementation of their redesign JSCC mapped the competencies within their 12 modules to ACT's College Readiness Standards by score range. ACT defines "readiness" for college-level math at a score of 22 and above. JSCC discovered that Modules 1 – 3 (Basic Math) mapped appropriately to the score range 16 – 19. They also discovered that 11 of the 20 competencies included in Modules 4 – 7 (Elementary Algebra) mapped appropriately to the score range 16 – 23 but that 9 of the competencies mapped to the score range 24 – 32 (i.e., were college-level competencies rather than developmental, according to ACT.) They also discovered that <u>all</u> but one of the 22 competencies included in Modules 8 – 12 (Intermediate

Algebra) mapped to the score range 24 – 32 (i.e., were college-level competencies rather than developmental, according to ACT.)

This means that students in developmental math (e.g., with an ACT score of 17 or 18) are, in essence, being held to a higher standard than students who are not in developmental math (e.g., with an ACT score of 19 or 20). This insight is leading JSCC and other TBR institutions to reconsider what is developmental vs. college-level course content.

Have you examined whether or not you are teaching college-level math in your remedial/developmental courses and, if so, how much? Are you unnecessarily prolonging the student experience in developmental math by doing so?

Conclusion

In a May 2009 *Chronicle of Higher Education* commentary, Education Sector's Kevin Carey aptly characterized the state of remedial/developmental education in the U.S. as follows: "Remediation is the no man's land of American education. Every year we send hundreds of thousands of young men and women over the top, across a rocky landscape strewn with pedagogical barbed wire and the remains of those who tried and failed before them. We know, without a doubt, that many of those eager and unsuspecting students won't make it. Yet we send them anyway, because there's always another fresh class of recruits to enroll. The cost to the nation in lost time and resources is astounding. The lofty goal of increasing the ranks of college graduates, voiced by President Obama and others, will not be met if we can't find a better way."

By taking either or both of the actions described above to restructure the content of remedial/developmental math courses, we could significantly reduce the number of students we send over the top. Then we could concentrate on ensuring that those who remain will be prepared to meet their educational and professional goals.