

HOW TO REDESIGN A DEVELOPMENTAL MATH PROGRAM BY USING THE EMPORIUM MODEL

II. Improving on the Essentials

Chapter I delineates the essential elements of the Emporium Model. We call these *essential* because including each element in the redesign is absolutely necessary in order to ensure success.

We have, however, discovered a lot of very good ideas that you should consider as you develop your redesign plan. They are not essential to success, but if NCAT were directly responsible for a redesign, we would certainly include them in our redesign plan.

Q: Have you examined whether you might be teaching college-level math in your remedial/developmental courses and if so, how much? Are you unnecessarily prolonging the student experience by doing so?

A: The ACT college readiness assessment is commonly used to assess students' academic readiness for college. ACT defines such readiness for college-level math at a score of 22 and above. Many institutions have discovered that their developmental math courses include a lot of college-level content. This insight has led the Tennessee Board of Regents, for example, to reconsider what constitutes developmental versus college-level course content. The result has been to restructure the curriculum and accelerate students' entry into college-level courses.

Example

When Jackson State Community College (JSCC) redesigned 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 the first full year of implementation of the redesign JSCC mapped its competencies to ACT's College Readiness Standards by score range. JSCC discovered that Modules 1–3 (Basic Math) mapped appropriately to score range 16–19. The college also discovered that 11 of the 20 competencies included in Modules 4–7 (Elementary Algebra) mapped appropriately to score range 16–23 but that 9 of the competencies mapped to score range 24–32 (i.e., were college-level competencies rather than developmental, according to ACT.) JSCC also discovered that all but one of the 22 competencies included in Modules 8–12 (Intermediate Algebra) mapped to score range 24–32 (i.e., were college-level competencies rather than developmental, according to ACT.)

Q: Are you preparing all students to succeed in science, technology, engineering, and mathematics (STEM) majors, even though most will not major in a STEM field?

A: ACT studies show that 80– 90 percent 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?

Example

Jackson State Community College (JSCC) recognizes that student goals are different: students may variously 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 moves away from remediation of students' high school algebra deficiencies and toward preparing students for their particular educational goals. Students are required to master only the concept deficiencies that are relevant to their educational and career goals.

After defining the competencies to be included in each of JSCC's 12 modules, the math faculty determined which modules were necessary for student success in each college-level general education math course. All other departments identified which modules were necessary for success 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 for success 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 require only 7 modules (47.1 percent of the students); 4 require 8 modules (31.2 percent of the students), and 7 require all 12 modules (20.3 percent of the students). One program requires only 6 modules (0.8 percent of the students), and one requires only 4 modules (0.6 percent of the students).

Students are advised of their multiexit opportunities based on their program-of-study choice and of the need to take more modules if they later change their majors. This is accomplished via information sheets for each major, focus group sessions, and individual counseling with math instructors and the students' academic advisers. The team also makes a campuswide presentation at in-service trainings and conducts sessions for adviser training in order to educate the college faculty and staff.

By changing the requirements for developmental math completion, JSCC was able to reduce by 31 percent the number of sections/modules it needed to offer. As an example, during the 2008/09 academic year, 1,836 students were enrolled in developmental math. 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.

Q: Do you need to administer diagnostic assessments beyond your initial placement test?

A: Because there is a common belief that large numbers of developmental math students can test out of some—or perhaps all—modules and accelerate their progress through the developmental math sequence, many institutions require module pretests as the first task that confronts the student. As most have discovered, however, very few students are able to test out. Frequently, only one or two students are able to do so.

Given this situation, we urge you to consider whether giving pretests for every module is sending a negative message to students: I failed the first test. Rather than allowing students to move quickly, the pretests become yet another hurdle for students and reinforce their view that they can't do math, math is hard, they will have difficulty; that is, the pretests represent failure before students have even begun to learn.

We strongly suggest that you think about whether pretests are adding anything to the developmental math program or whether they are actually adding to math anxiety and demotivating students. One can always retain the option of allowing students who believe they already know the material to challenge a module by taking the pretest, but we think that pretesting should be an option rather than the rule.

Example

When Jackson State Community College (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.

JSCC experimented with module placement by ACT scores and ACT Compass scores. The school found that over 95 percent of the students would have been placed above their deficient level if ACT or ACT Compass placement were the only tool used. The school concluded that while the ACT and ACT Compass tests may be sufficient to determine whether a student is college ready or not for mathematics, they are not appropriate diagnostic tools to determine mastery of specific competencies.

Consequently, JSCC developed its own diagnostic assessment by using MyMathTest, which corresponded to the competencies in the 12 modules. Of the 1,067 new students tested in fall 2007 and spring 2008, only 3 percent of the students did not need to study the competencies in Modules 1–3 (Basic Math). Based on these results, JSCC decided that requiring students to take the additional diagnostic assessment was a waste of time because 97 percent of the students tested into Module 1. Now each student passes each module, proving mastery of each skill rather than a general level of competency as indicated by ACT/ACT Compass scores.

Q: While the cost savings goal of the Emporium Model is to reduce the institutional cost of offering developmental math, do students benefit financially as well?

A: The Emporium Model can produce substantial savings for students, depending on the decisions that institutions make. Here are some ways in which students saved money because of the redesign:

- *Saving tuition dollars.* Modularizing the developmental math sequence allows students to move from one course to the next within the same semester. At most institutions, students save on tuition because they are allowed to complete as many courses as possible in one semester while paying tuition for only the one in which they register. Those who work through all the modules can finish the entire program in one semester and pay for one course instead of two or three, as they would have done in the traditional format.
- *Reducing the required number of credits.* Several institutions have redesigned multiple courses in the developmental math sequence to eliminate duplication and topics that are beyond the scope of developmental math. This allows the total number of credit hours for the sequence to be decreased, which represents savings for students by decreasing the number of credit hours for which they needed to pay tuition.
- *Lowering the cost of course materials.* Many institutions have been able to lower the cost of materials significantly, creating additional savings for students. Students purchase only one textbook and one software access code, as opposed to purchasing three different textbooks, to complete their developmental work. Several institutions have developed customized textbooks that include the material for all courses in the sequence. Other projects have entirely eliminated textbooks, requiring only the purchase of an access code (which includes an electronic textbook at no additional cost to the student).
- *Accommodating life events.* Many students, especially community college students, are juggling many responsibilities such as jobs, families, and care of parents. As a result, they are often unable to complete courses in a single term. Many of them may be working diligently, but a life event occurs that prevents them from reaching their educational goals. When life events interfere in the traditional model, students must withdraw—thereby losing tuition and any progress they have made—and start over the following term. In the Emporium Model, they can adjust their schedules instead of having to withdraw from the course. Later, they can return to the class and pick up where they left off.