The National Center for Academic Transformation

# EDUCATION DELAYED IS EDUCATION DENIED

**by**
**Carol A. Twigg**

Most Americans are familiar with the legal maxim, "Justice delayed is justice denied." It means that if legal redress is available for someone who has suffered an injury but is not forthcoming in a timely fashion, it is effectively the same as having no redress at all. This principle is the basis for the right to a speedy trial and similar rights, which are meant to expedite the legal system.

The applicability of that maxim to higher education suggests that education delayed is education denied, especially when it comes to community college students placed into developmental mathematics. Early results from NCAT's *Changing the Equation* (CTE) program has shown us a way to make a significant dent in this problem--and to do so at a reduced cost to *both* institutions and students.

## The Problem

Manchester Community College, a CTE participant, is one of the twelve community colleges in the Connecticut Community College system with an annual enrollment of 15,000 students. Manchester, like all institutions in the Connecticut system, offers two developmental math courses, Pre-algebra and Elementary Algebra. Students are placed into the math sequence based on scores on the Accuplacer test. Fifty percent of newly enrolled students place into a developmental math course, and, of those, 17 percent place into Pre-algebra. The college devotes one-third of its full- and part-time mathematics faculty workload to teaching developmental math courses to about 1,500 students per year.

Despite the resources devoted to developmental math education at MCC, pass rates and persistence of students have been, in the college's words, "dismal." Average pass rates in the developmental courses are lower than the 65 percent college average for all courses: 55 percent for Pre-algebra and 60 percent for Elementary Algebra. Furthermore, it will take a student who begins in Pre-algebra at minimum three or more terms to complete the sequence through Intermediate Algebra, the first college-level math course at MCC. Data collected at the college over five years demonstrate that only 8 percent of students who began with Pre-algebra pass Intermediate Algebra.

These data are consistent with national studies. Nationally, nearly 60 percent of incoming community college students must take at least one developmental course, in math or English before enrolling in any credit-bearing classes toward a degree (Bailey 2009; Attewell et al. 2006.) Within developmental education, students are most likely to need help with mathematics. These data are based on the National Educational Longitudinal Study, which reports on the enrollment of traditional school-age students in developmental education courses. The actual percentage of students enrolled in

developmental courses at community colleges is likely higher, given that community colleges enroll a large number of non-traditional students returning to college from the workforce.

The sheer number of students requiring developmental education in math or English incurs significant expense not only for the students who pay tuition but for states and the colleges as well. Although the precise costs of developmental education are unknown, estimates range from $1.2 to $2.3 billion annually for all community colleges and $500 million for public four-year colleges (Collins 2010.)

**More than Just a Leaky Pipe**

Higher education has grown familiar with the “pipeline” discussion, which describes how students are lost along the way from leaving high school to enrollment in college to graduation. But for students placed in developmental math, the leaks in the pipeline are cannot be fixed with the educational equivalent of plumber’s putty. These leaks are so catastrophic they require a whole new pipe.

A recent study published in the *Economics of Education Review* of institutions participating in Achieving the Dream, a national initiative to improve community college student success, reported that 59 percent of all community college students were referred to developmental math, with 19 percent of the students directed to courses three levels below college-level math.

Unfortunately, many students placed in developmental math choose to bypass those courses and associated services. Of those students referred to any developmental math course, 79 percent actually enrolled. Of those referred to three levels below college-level math, only 31 percent actually enrolled. So we lose a good number of students before they ever enroll in developmental math.

What happens to those who enroll? According to the Carnegie Foundation for the Advancement of Teaching, students are more likely to fail developmental math than any other course in higher education. Of those students who enrolled in any developmental math course, only 33 percent completed the developmental math sequence. Of those referred to three levels below college-level math, only 17 percent completed the developmental sequence.

It is the latter students—the ones furthest behind in math—who are least likely ever to advance into classes for college credit. Only 10 percent of this group made it past the developmental math sequence to complete even one college-level, credit-bearing course. Those who hit a roadblock in the lowest levels of developmental math are the most at risk for giving up on ever earning a postsecondary credential.

Students referred to a higher level of developmental math do not fare much better. Only 20 percent of those students who complete the developmental sequence go on to complete one or more credit-bearing college courses.

I am not a statistical whiz, but even I can appreciate how great the loss is. Let’s say your incoming freshman class has 1,000 students. Of those, 600 must take developmental math. Of those 600, only 474 actually enroll. Of those, 156 actually

complete the sequence. And, of those, only 31 students complete at least one college-level math course. You lose 569 of 1,000 students every year, just because of the developmental math problem.

**The Issue of Student Mobility**

We need a better understanding of *why* students don't move through the sequence. Part of the reason is, of course, that they do not pass the courses because they do not or cannot do the work. What we at NCAT have found, however, is that the problem is more complex than students' inability to pass developmental math courses. A larger part of the problem may be how those courses are organized and the ways in which students move or do not move through them. We need to increase *student mobility* within the developmental math sequence, and that's what the CTE institutions have been able to accomplish even at this early date.

In previous articles, we have provided evidence that the institutions involved in CTE are representative of community colleges across the U.S. (See the January 2011 issue of *The Learning MarketSpace*.) The majority (79 percent) of community colleges offer two developmental math courses (34 percent) or three developmental math courses (45 percent). The remaining 21 percent offer as many as four, five or even six courses.

In the traditional model, students who fail one developmental math course have to repeat the entire course before progressing on to the next course in the sequence, even if they have mastered a significant amount of material in their first term. This means that students at community colleges that offer a two-course sequence of developmental math may spend two, three or more terms in the sequence. Students at community colleges that offer a three-course sequence of developmental math may spend three, four or more terms in the sequence. This delay in moving toward enrollment in a college-level course often seems insurmountable to many students and surely contributes to overall institutional attrition rates.

**A Whole New Pipe**

In the redesigned course sequence at CTE institutions, all course content has been modularized and taught in the Emporium Model. In some cases, the original courses have been retained with modularized content; in other cases, multiple courses have been collapsed into one modularized course. Modularization and the Emporium Model have allowed students to move from one course to the next within the same term. Regardless of the format, all students in CTE projects can begin a second (or third) course within the same term as soon as they complete the necessary number of modules equivalent to the traditional course. Students begin a new course in the midst of a current term, complete as much of it as possible and continue on with the same course in the next term. This means that students can complete two or more levels of developmental math in one term. And it means that students who complete a course before the term is over can work on modules in a future course without paying tuition. Students are allowed to complete as many courses as possible in one term while only paying tuition for the one they registered for.

Students who complete one course and begin another within a single term retain that progress into the next term and begin where they left off. Students who do not complete the requisite number of modules by the end of the term are either given an F or an "in-progress" or "making progress" grade. Regardless of the grading system that is used, performance data for individual students migrate from one term to the subsequent term. Motivated students can complete their developmental math program in as little as one term, allowing them to achieve their educational goals sooner and at a lower cost. The ability to carry forward individual learning accomplishments to a subsequent term offers huge benefits for students, saving them both time and money.

**Benefits to Students**

- Moving into college-level courses

  The time considerations to complete the entire developmental sequence are now tremendously reduced. By completing required math courses in fewer terms, students are able to enter into their courses of study earlier and reduce the amount of time they are in school. This puts students on track to complete their certificate or degree program on time, a significant motivating factor for students.

- Saving tuition dollars

  Several of the CTE institutions have calculated how much tuition a student can actually save as a result of the redesigned sequence.

  At Manchester Community College, the redesign allows a student to complete up to three courses in one quarter and pay for only one. If taken individually over three quarters, the courses would cost the student $1,095 compared with taking them all in one quarter at a cost of $421.25. This is a 61.5 percent savings to the student. Even if the student can only complete two of the courses in one quarter and finish the third in the next quarter, s/he would save 30.8 percent.

  Iowa Western Community College offers four levels of developmental math: Basic Math, Pre-Algebra, Elementary Algebra I, and Elementary Algebra II to a total enrollment of 2464 students. For students who complete the developmental math sequence in one term, the tuition savings is $1,071 per student. For students who complete the sequence in two terms, the tuition savings is $714 per student.

  Lurleen B. Wallace Community College students save tuition dollars since they are allowed to complete as many courses as possible in one term while only paying tuition for the one they registered for. In the traditional setting, students that began in the first developmental math course would typically not complete the sequence in less than three terms. In the redesign, a student who works through all modules can finish the entire program in one term and pay for one course instead of three courses, a tuition savings of $654.

- Lowering the cost of course materials

  Several of the projects have been able to lower the cost of materials significantly, creating additional savings for students. At Manchester Community College, students purchase one textbook and one software access code good for two years as opposed to the old system where students purchased three different textbooks to complete their developmental work. Guilford Technical Community College students also only need to purchase one book and one online code for all three developmental math courses. Washington State Community College has developed a customized textbook, which includes the material for all courses in the sequence. Students need to purchase only one textbook and one software access code. In the past, developmental courses at Washington State required two textbooks and two software access codes.

  Other projects have entirely eliminated the need to purchase a textbook. Somerset Community College, Miami Dade College and Nashville State Community College, for example, require only the purchase of the access code, which includes an e-book (electronic textbook) at no additional cost to the student. Paper copies are still available if desired. At Iowa Western, the cost to purchase three textbooks to complete the traditional developmental math courses used to cost a student approximately $225. A two-term access code can now take a student through the entire sequence at the cost of $120.

- Accommodating life events

  Students in developmental math and in community colleges in general are juggling many responsibilities such as jobs, families, parents, etc. As a result, they are often unable to complete a course during the term. Many students may be working diligently to achieve their dreams but have a “life event” occur, prohibiting them from reaching their educational goals. When life interferes in the traditional model, students must withdraw, losing tuition and any progress they have made, and start over the following term.

  In the CTE redesigns, students can adjust their schedules to suit life changes instead of having to withdraw from the course and lose the tuition they paid for the course. They can return to the class and pick up where they left off after resolving the life event. Students no longer have to drop the course when work or family obligations keep them from attending class. Students can change course sections instead of withdrawing and attend class at a different time, decreasing the number of terms needed to complete developmental math requirements.

- Reducing scheduling roadblocks

  Another problem faced by many community colleges is low-enrollment sections, particularly on smaller campuses and sites or during certain class times. Because

these sections do not “fill,” they must frequently be cancelled, interrupting student progression through the sequence.

Several years ago, the math department at Cleveland State Community College created what they dubbed the “one-room schoolhouse” approach to low-enrollment classes. This means that the college offers multiple developmental math courses in the same computer classroom or lab at the same time, effectively offering all courses at any time. The one-room schoolhouse was enthusiastically adopted by many of the CTE participants. This strategy enables the institution to increase course offerings and avoid cancelling classes, which, in turn, reduces scheduling roadblocks for students and enables them to complete their degree requirements sooner.

Students can match their school schedules to their personal schedules more easily. Colleges can easily move students to a different course within the developmental sequence—i.e., students who encounter difficulty in one course can be moved to a lower course without changing their schedule. Not only does the one-room schoolhouse create institutional cost savings, but students have greater opportunity to schedule courses on demand. The availability of all courses all the time means that students do not have to delay their progression and can improve overall completion opportunities.

## Conclusion

Let’s return to our incoming freshman class of 1,000 students and the 600 that must take developmental math. Perhaps the reason that only 474 actually enroll is because they don’t want to face two, three or more terms of a subject that they both dislike and have done poorly in. If we can move all students more quickly through the sequence, we may be able to get close to enrolling all 600. Chances are that we can help the 318 students who never make it out of the sequence do so by saving them both time and money as outlined above. And because the Emporium Model significantly increases how much students learn, they will be better prepared to succeed in college-level math.

In the traditional approach to developmental math, students are locked into a system of courses where the educational equivalent of a “speedy trial” is impossible to obtain. Students have to re-start at the beginning of a course whenever they encounter an academic or personal speed bump, even though they may have already completed a significant portion of the course. This means that delay is a built-in feature of the system. By redesigning developmental math using NCAT principles and the Emporium Model, colleges can take a big step toward ending the practice of education delayed is education denied.