Within Our Sights: Toward National Leadership in Higher Education | October 18, 2013
Morning Panel Presentation
Not Just a Numbers Game: Ensuring Success in Developmental Math

Presenter Contact Information

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Campus Project

Math Alignment Project

Among the five goals for our Vision grant, the math department worked on Goal 1: College-Going Rates of High School Students and Goal 4: Achievement on Assessment of Learning. Among the objectives in Goal 1 were (a) trying to increase the number of incoming students who place into college-level math, (b) trying to increase the number of new students who review math, whether in between-semester workshops or at the beginning of the semester, before retesting, and (c) working on alignment. The objective in Goal 4 was to design a non-STEM pathway. Over the last few years, a group of high school and college math teachers have met regularly at BCC to discuss teaching and other issues. Specifically we created a fourth-year algebra-based course that we hoped would help students make a better transition to college. Virtually all local high schools offered this course during the 2010-2011 school year. During the fall 2011 testing cycle, college-level math placements went up a bit and have not varied much since. We have offered between-semester math refresher workshops for many years, but during the last few semesters, we have allowed students in some courses this opportunity during the first two weeks of the term. Alignment, both external with local high schools and internal, have been a big focus. We have made every effort to align our self-paced and teacher-paced courses. Finally, this semester we are offering a non-stem developmental course that may allow students to move from arithmetic to a survey class or statistics in one semester. It is a five-hour, four-credit class

Vision Project Outcome Areas

- ✓ **College Completion**

Research and Data

Project Duration: *n/a*

- College-level math placements: 2008-13.2%, 2009-13.2%, 2010-13.8%, 2011-15.8%, 2012-14.9%, 2013-16.9%
- During the first two weeks of the 2013 SP semester, 42 student worked on a math review program. Among the half who re-took Accuplacer, about half of those showed an increase of at least one "level." (Five students increased one level and five increased two levels.)
- In an effort to align teacher-paced and student-paced developmental math courses, we have standardized tests and syllabi to some degree. For example, teacher-paced students were allowed retesting using student-paced tests. We made all tests consistent and returnable; self-paced student passing rates increased from 47.1% to 58.4%.
- Our new non-STEM developmental course is too new to measure!

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Campus Project

Developmental Mathematics: A Redesigned Approach

Fitchburg State University is using a multi-pronged approach to enhance the performance of students enrolled in developmental mathematics courses. The model being implemented not only serves those with developmental math needs but also enhances the success of all students. Efforts include the following:

1. The mathematics faculty developed a policy requiring all students to take their first math course in year one, whether it be developmental or one of the requirements for their major, and continue to take math courses, with no gaps, until they have completed their first college level math course.
2. A new self-paced modular developmental math course was designed using MyMathLab, and was piloted with the intent to help ensure the retention and success of students needing mathematics remediation.
3. An automated messaging system, Starfish, is being implemented to give at risk students timely advice and notification of support services that can help them succeed.
4. Augmentations to the math placement testing system are being considered, including more detailed diagnostics to better assess specific areas of need for incoming students as well as new preparation options for taking the tests to improve passing rates.

Vision Project Outcome Areas

- ✓ **College Completion**
- ✓ **Student Learning**
- ✓ **Closing Achievement Gaps**

Research and Data

Project Duration: *Sept. 1, 2012 - August 31, 2015*
(ISA received December 2012 and project formally began at that point)

- 145 students enrolled in Basic Math II in the Spring 2013 semester were involved in the project. 62 students enrolled in the modular pilot and 83 students were enrolled in the traditional lecture course.
- Students enrolled in the modular pilot had an average GPA of 2.56 in the course while those in the traditional lecture format course had an average GPA of 2.25.
- Student success in the modular pilot varied markedly depending on the section in which they enrolled. One section had an average GPA of 3.51, another of 3.50 and another at 1.65. It was discovered that the instructor who had students with the lower GPA gave 0.0 to those who did not finish the course. The instructors of the other two sections gave a grade of "incomplete" to the students in their sections who did not complete the course.
- We began implementing the Starfish automated messaging system. The roll-out involved 9 instructors and 158 students. 64% of the students and 100% of the faculty recommended the Starfish system be used university-wide.
- We implemented a new policy requiring students to take mathematics courses beginning in their first year. In the fall semester, 7 students testing into in Developmental Math I did not enroll in their math course and 19 students who tested into Developmental Math II did not enroll in a mathematics course.

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Campus Project

RAMP-Up Math Program

The RAMP-UP Math program represents a complete redesign of MCC's developmental math sequence from a traditionally delivered course to a course that is modular, mastery-based, and technologically driven. The RAMP-UP initiative (Review, Achieve, Master, and Progress) began as a pilot in spring 2011 and was fully implemented during the 2011-12 academic year. The program provides technology-mediated instruction using My Math Lab. The approach is based on a nationally recognized model that has demonstrated success in both two-year and four-year institutions. The program was adopted to give students the opportunity to complete the developmental math sequence in a shorter period of time.

Vision Project Outcome Areas

- ✓ **College Completion**

Research and Data

Project Duration: *Spring 2011 – Ongoing*

- Serves all developmental math students - (1800+ students in Fall 2013)
- Provides an opportunity for students to be ready for a college level math class in fewer semesters
- Success rates increased from 54% in Fall 2010 to 66% in Fall 2012 after the redesign
- 22% of Fall 2012 students completed the equivalent of 2 developmental math courses (or more) in one semester
- Persistence in math courses increased from 52% in Fall 2010 to 62% in Fall 2012
- Persistence at the college increased from 70% in Fall 2010 to 75% in Fall 2012

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Campus Project

Clearing the Path to STEM Careers: Plugging the Leaks in the Worcester Math Pipeline

The Quinsigamond Community College (QCC) project strives to improve the Worcester math pipeline, and position Worcester Public Schools (WPS) and QCC students for success in STEM programs/careers. The QCC Partnership with WPS has led to the formation of a Vision Project K-14 Leadership Team to guide and develop vision project activities. One such activity is an early intervention program that allows students to take the Accuplacer while they are still in high school and provides pathways for students based on those results. Students who test lower than college-level math are able to participate in Math Pre-Assessment Workshops (MPAWS), Math Boot Camps, and/or newly-developed (and articulated) algebraic reasoning courses that align the Common Core Standards to the QCC pre-college math curriculum. QCC also offers their MAT 100 course at WPS and QCC, through a dual enrollment option, to WPS students who either test into an introductory college-level math course or successfully complete the pre-college math curriculum. At the community college level, the QCC Emporium Model Project gives students another, alternate way to accelerate through developmental math. Utilizing computer-based learning, the emporium model is a student-centered, flexible learning environment that is supported in real-time by individualized instruction, interaction and engagement in a computerized math classroom. Students progress through a series of modules at their own pace, where they must demonstrate 80% mastery on each assignment before advancing. The students can complete multiple developmental courses in a single semester. Because the emporium model involves a great deal of individualized support and attention, a teacher and teaching assistant are present in the classrooms. Additionally, the students are provided with an extra lab hour each week to help ensure they spend enough time on task in an environment with all the support and technology necessary to help them succeed. The QCC Partnership with Worcester State University has led to the formation of a Faculty Articulation Collaborative Team (FACT) to create seamless transfer pathways among the campuses. The FACT team now also includes representatives from Fitchburg State University and Mount Wachusett Community College.

Vision Project Outcome Areas

- ✓ **College Participation**
- ✓ **College Completion**
- ✓ **Student Learning**

Research and Data

Project Duration: *Fall 2011 - Spring 2014*

- In Fall 2012, QCC's 8,991 student population was approximately 33% ethnic minority, including 14.8% Hispanic or Latino, 11.6% Black or African American, and 4.1% Asian. The total number of first time freshman enrolled in any math class was 1,327. The total number of first time freshman enrolled in developmental math was 1,049 or 79.1%.
- QCC allocates three classrooms, each equipped with 22 computers, in its newly renovated North Wing on MWF, from 8:00 or 9:00 a.m. until 12:00 or 1:00 p.m., to run four sections of emporium model courses for each of its three levels of developmental math - MAT 090, MAT 095 and MAT 099.
- In Spring 2013, 22% of emporium students successfully completed their respective developmental course before the end of the semester.
- In Fall 2012, a higher percentage of emporium students passed the final exam than non-emporium students who attempted the exam, with borderline statistical significance in favor of the emporium in MAT 099. (MAT 090: 85% vs. 80%; MAT 095: 82% vs. 81%; MAT 099: 80% vs. 67%) When considering all students enrolled in a developmental math course at the end of the Fall 2012 semester, a higher percentage of emporium students passed the final exam in MAT 090 and MAT 099 than non-emporium students, with statistical significance in MAT 099. (MAT 090: 65% vs. 64%; MAT 095: 54% vs. 65%; MAT 099: 74% vs. 57%)
- In Spring 2013, a higher percentage of MAT 090 and MAT 095 emporium students who attempted the final exam passed than the Spring 2012 non-emporium students who attempted the same exams. (MAT 090: 84% vs. 82%; MAT 095: 89% vs. 78%; MAT 099: 64% vs. 69%) When considering all emporium students enrolled in a developmental math course in Spring 2013, a higher percentage of emporium students passed the final exam than non-emporium students in Spring 2012. (MAT 090: 67% vs. 62%; MAT 095: 64% vs. 61%; MAT 099: 56% vs. 55%) However, there was no statistical significance in those final exam passage rates.
- Since Fall 2012, four short-duration MPAWS/Math Boot Camps and several year-long Algebraic Reasoning courses have been provided to WPS students. The MPAWS were held at WPS and the Math Boot Camps were held at QCC. The Algebraic Reasoning courses are or have been held at three high schools with a total of 550 students. So far, 127 students have completed the course, with 39 students passing a single level of developmental math (MAT 095) and 34 students passing two levels of developmental math (MAT 095/099). There have also been three sections of dual enrollment MAT 100 courses (2 at WPS and 1 at QCC). Ninety-three percent of the 41 students passed MAT 100 with a grade of "C" or higher.

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Campus Project

Increasing Students' Completion Rates in Developmental Mathematics

Roxbury CC transformed our Developmental Mathematics curriculum in six phases to increase students' retention and completion rates.

1. The Math Department collapsed the Dev Math sequence by tailoring courses to STEM and non-STEM majors, instead of having all students pass all courses. Non-STEM majors complete or place out of MAT 087-Basic Math and MAT 088-Intro Algebra. STEM majors complete or place out of MAT 087-Basic Math, MAT 088-Intro Algebra and MAT 099-Intermediate Algebra.
2. The College encourages all students to take a Math course during their first semester, especially those who place into Dev Math on the Accuplacer.
3. The College integrated technology into the Dev Math curriculum with a required weekly computer lab component for every course and with technology-assisted classroom instruction through classroom upgrades.
4. The College introduced MyMathLab modules for students who choose to accelerate and complete a Dev Math course during the first three weeks of the semester.
5. The College funded a Math Clinic with one full-time coordinator/tutor and one part-time tutor in the Fall 2011. For AYR 2012-13,t here were 2,440 student visits to Math Clinic for tutorial help in every Math course, including the three Dev Math courses.
6. I aligned the Dev Math courses' content with the new Common Core State Standards in Mathematics as a Final Project for my 2012-13 HERS program (Higher Education Resource Services). I presented it to the College for discussion during the May 2013 Faculty Academy.

Vision Project Outcome Areas

- ✓ **College Completion**
- ✓ **Student Learning**
- ✓ **Closing Achievement Gaps**

Research and Data

Project Duration: *Fall 2010 - Spring 2015*

- 25% of Fall 2009 students enrolled in Dev Math courses progressed to college-level Math by their third semester, compared to 11% of the Fall 2006 Dev Math cohort.
- 56% of the 892 newly enrolled students in Fall 2010 took a Dev Math coursecompared to 49% of 958 new students in Fall 2009.
- The Dev Math interventions have been scaled to reach 56% of all new students and 100% of Dev Math students.
- Roxbury CC in Fall 2010 had 2,700 students; 48% percent of students were African American and 16% were Hispanic.