Project Overview

Montgomery County Community College (MCCC), was awarded a Hewlett Grant for $270,000 from the Community College Research Center (CCRC) housed at Teachers College, Columbia University, to replicate a new course redesign and to improve learning within the institution.

According to CCRC’s research, roughly 45 percent of students who place into a developmental math course one level below the college level complete their remediation requirements. Among students who begin three or more levels below college math, only 17 percent complete their entire developmental sequence.

The MCCC course redesign Concepts of Numbers for Arithmetic and Prealgebra, was developed and piloted by Barbara Lontz, Assistant Professor of Mathematics at MCCC in 2008. This curricular reform employs a conceptual rather than topic-focused approach in teaching arithmetic in order to make mathematical connections more transparent and to provide students with sustained practice in foundational elements of quantitative reasoning. Internal evaluations conducted by MCCC suggest that, relative to students taking the traditional arithmetic course, a higher proportion of Concepts of Numbers students passed arithmetic and enrolled in and passed beginning algebra. Concepts of Numbers was fully scaled to all arithmetic sections at MCCC in fall 2011. Barbara Lontz and a team of MCCC faculty, Tracy Halsey and Jim Muscatell are working with two community colleges to launch and scale Concepts of Number at their institutions beginning this past fall 2012.

These two replicating colleges are Berkshire Community College in Pittsfield, Massachusetts and Reading Area Community College in Reading, PA. Additionally, Barbara has made several connections at various conferences resulting in pilots of Concepts of Numbers at additional colleges. These colleges include, West Chester University and Luzerne County Community College in Pennsylvania, Palomar College and Imperial Valley College in California and Triton College in Illinois.

Concepts of Numbers — A New Approach to Teaching Math

In addition to replication, the grant provided a forum for faculty to work together to improve the course within the institution. The CON-NECT (Concepts of Numbers—Networking Educators’ Collaborative Thoughts) professional development group meets 5 times per semester to gain a better understanding of Concepts of Numbers by sharing teaching strategies, learning about the discovery approach, and providing feedback about the textbook. On November 9, 2012, faculty from Montgomery County Community College, Berkshire Community College and Reading Area Community College were in attendance.
Deeper Results

Gathering input from the CON-NECT group, grant partners and replicating colleges, resulted in several enhancements to the course. The textbook is now in its third edition and the groups continue to make improvements to the text. The fourth addition will be available in Spring 2014. A universal portal was created through Pearson Learning Solutions that provides student practice using MATH XL software and faculty access that contains links to course ancillaries and support. An online course orientation was developed for faculty and tutors new to teaching Concepts. Additionally, clicker reviews for each unit were created at MCCC. These reviews can also be accessed in PowerPoint for colleges that do not have clickers.

Pilot Results

“Teach me, and I will forget. Show me, and I will remember. Involve me, and I will understand.”
A Chinese Proverb

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<tr>
<th>MAT010 Concepts of Numbers versus MAT010 Traditional Course</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Concepts of Numbers</td>
</tr>
<tr>
<td>N = 19</td>
</tr>
<tr>
<td>Traditional Arithmetic</td>
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<td>N = 664</td>
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Success Rates: Success is a grade of C or better. Withdraws count as non-success.
* the top 13% of Arithmetic Accuplacer scorers were accelerated into the next course (a 4 credit beginning algebra class)
** an additional top 12% of Arithmetic Accuplacer scorers were accelerated into the next course (a 4 credit beginning algebra class)

Faculty Reflections!

Krystyna Szymanski, adjunct instructor at Montgomery County Community College found the CON-NECT professional development activities extremely useful. “When we were meeting it gave us a sense of unity, that we are people who are working on the same stuff and trying to make it better. We have shared our ups and downs, which is extremely important and there were a number of practical things that people introduced and implemented.” Krystyna learned many useful tips from these meetings. For example, when teaching the subtraction concept, having students compare the heights of the students in class and take the difference between them. Krystyna also incorporates the “Clicker” reviews at the end of each unit. “Students like them and it is a nice review.” Krystyna also understands the rationale for this course stating, “Students who are coming have big deficiencies. Perhaps this is due to a long break in-between school and college or that some students have a shallow understanding of math.”

Summer Trout, Coordinator of Tutorial Services, MCCC West Campus also thought the CON-NECT professional development Group was beneficial. “The CON-NECT group helped me identify what’s important from the teacher’s perspective vs. the student’s perspective. When a student comes into tutoring they come in with a specific problem. Because of my participation in the CON-NECT group, I’m learning what the important points are from the instructor and this puts things in context for helping the student.” Through these professional development sessions, Summer has gained a better understanding of the rationale of Concepts, “When the idea was first introduced, many students and instructors weren’t really sure how it was different or if it was effective or if we were doing something different just to do something different. It is interesting. The way we traditionally teach math is arbitrary. We just pick these different ideas we are going to cover. It does make sense to clump these ideas into concepts.”