# **Promising Practices**

# **Math Curriculum Alignment**

The NCTN Promising Practice Series presents detailed descriptions of strategies from the field that are designed to promote the successful transition of adult basic education students from ABE/ESOL to postsecondary education.

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## **Program Context**

The Urban Corridor Project (UCP) was designed to build upon the positive adult-education transition initiatives that have been implemented in Hartford, CT between Capital Community College and Hartford Adult Education and in New Haven, CT between Gateway Community College and New Haven Adult Education.

The goals of the UCP were:

- Develop and pilot an "aligned" adult-education math curriculum that addresses the gap between the adult-education and college-level math programs
- Integrate the aligned math curriculum into the adult secondary level of instruction at both adult-education programs.
- Increase the number of students from Hartford and New Haven adult-education programs who take the ACCUPLACER and successfully place into college-level math or the highest level of developmental math at both community colleges.
- Increase the number of adult-education students who enter postsecondary education prepared to succeed at creditlevel college math.

The pilot program was designed to serve 30 individuals who were enrolled in either Hartford or New Haven adulteducation programs, who were pursuing their high school diploma or GED, and who were planning to enroll in postsecondary education upon graduation.

The program provided students with assessment, instruction, tutoring, limited case management and academic and financial aid counseling. Students were dual-enrolled at each of the community colleges and had access to the student services available on campus, including the library, math center, writing center, computer labs, etc.

# **Rationale and Background of the Practice**

Capital Community College found that 90 percent of the individuals who enter college require one or more developmental courses and 30 percent of those students require four or more developmental courses in reading, writing, or math.

We analyzed the data on developmental math course completion and grades from both colleges over three academic years (2002–2005) and found that the number of students completing the course with a grade of C or better were dropping annually. There was also a very high rate of withdrawal from developmental courses. Both statistics pointed to the need for intervention.

It can take students one to two years before they achieve full academic proficiency in college. During this time it is very difficult to retain students. In order to improve the number of nontraditional adult learners who stay in college, it is critical that adult-education programs and community colleges work together to align their curricula through the design and implementation of transition bridge programs such as the Urban Corridor Project.

# **Description of the Practice**

We received funding from the Nellie Mae Education Foundation to develop the math alignment program and pilot it in 2007. The project required administrative staff, math instructors from all of the partnering organizations, tutoring, case management, and liaison assistance from the Connecticut Department of Education.

This project created an opportunity for four organizations serving the major urban centers of Connecticut to share best practices related to transition from adult education to college with respect to mathematics preparation. The collaboration

resulted in the formal alignment of the adult-education math course with the community college's first-level developmental math course and an introduction to the concepts that will be taught in the second-level developmental math course at the colleges.

To develop the alignment program, we first held a series of six meetings to bring together Hartford and New Haven adulteducation teachers with math instructors and the chairs of the math departments at Gateway and Capital Community Colleges. We charted the gaps between the existing adult-education math curriculum and the skills students needed to succeed at college. We found that the adult-education programs covered some pre-algebra, but there were major gaps in algebra skills, particularly related to linear equations, variables, graph and slope, and command and control of signed numbers. The other big gap was factoring quadratic expressions, and factoring in general. At the time, the adulteducation programs taught this material, but only very superficially.

#### The Adult Math Transition Course

The adult-education and community college instructors worked as a team on curriculum alignment to design a new "bridge" curriculum. As part of this process, the college faculty shared tools and techniques with adult-education instructors to enable them to deliver a new course that was equivalent to Math 075, the developmental pre-algebra course that was offered at the community colleges.

This new course, known as the Adult Math Transition Course, employed integrated lessons, exercises and learning activities to tie together arithmetic concepts and skill development with the higher-level applications of critical thinking and problem solving required by algebra. All topics were aligned with state guidelines and National Council of Teachers of Math (NCTM) standards. The goal was to mathematically empower students through the use of charts, graphs, concrete models, technology, and relevant, interesting applications. The course content included basic algebra, geometry, statistics, probability, data display and analysis and discrete mathematics. This course was designed to enhance the non-traditional adult learners' mathematical literacy to help prepare them for the mathematical assessment test at college.

#### **Two College-Level Courses**

In addition to the new pre-algebra course, college faculty members delivered two additional college courses at the adulteducation sites (through funding from another grant to support the project):

#### College Success

Using instruction, self-assessments, research projects and interactive activities, this course covers material found in the community college course known as Interdisciplinary Studies 105. Students learn about the study skills and strategies that they need to succeed in postsecondary education, including library research, information literacy, goal setting and time management, study and test taking techniques, and basic computer skills. In addition, students also explore different learning styles and career interests.

#### • Introductory Algebra

This course replicates the Math 094-095 sequence, the highest level developmental education course preceding college-level math (Math 137). This transition from arithmetic to algebra introduces the concept of variables, algebraic expressions, equations, elementary geometry, and graphing. In support of this transition, the properties of real numbers with emphasis on whole numbers, signed numbers, and rational numbers are also introduced. Estimation, appropriate use of technology, and basic application problems are included. Other topics include algebraic symbolism, properties of the real numbers, operations on algebraic expressions, solving linear equations and inequalities, operations on polynomials, laws of exponents, factoring, solving quadratic equations by factoring, graphing equations and finding equations of lines.

The college faculty reviewed the information that was covered in these courses with the adult-education instructors so they were prepared to reinforce the information in their own classes.

#### **Initiating the Pilot Program**

A cohort of students at each adult-education site was recruited to enroll in the bridge program as an alternative to the traditional adult-education math course. These students took the ACCUPLACER to ensure that their baseline math skill levels were appropriate for the program.

Students who passed the ACCUPLACER were dual-enrolled at the participating college and were eligible to access the various on-campus student resources, including the library, bookstore, tutoring centers, academic advising, free student lectures, etc.

Students began the pilot program by taking two courses simultaneously: the new Adult Math Transition Course and College Success. Both courses were provided tuition-free at the adult-education sites and met for a total of 45 hours each. The courses were scheduled to accommodate the adult-education schedule while also fulfilling the colleges' minimum time requirements.

In the Adult Math Transition Course, students' progress was assessed as it would have been in any adult-education or college course. The students were evaluated on class participation, homework, in-class exercises, quizzes and exams. College Success provided the students with study skills and the framework necessary to build a solid foundation for future learning and colleges disciplines. Students who successfully completed this course earned 3 college credits.

After completing the Adult Math Transition Course with a grade of C or better, students moved on to Introductory Algebra. Students passing Introductory Algebra with a grade of "C" or better could then go on to take a college-level math course, Intermediate Algebra, on the community college campus.





#### Challenges

Retention and case management services were a challenge. The ideal scenario would have been to have a case manager who was dedicated to working with the colleges and the adult students who were preparing to transition to postsecondary education. Unfortunately this was not available due to adult-education funding and staffing limits, so a more limited amount of retention and case management support was provided.

## **Cost & Funding**

Designing the new Adult Math Transition Course required a considerable amount of staff time at the adult-education programs and community colleges. Once the new course was designed, presenting it imposed no additional costs since it simply replaced an existing course at the adult-education sites. The College Success and Introductory Algebra courses imposed costs for materials, textbooks and the college faculty's time. Tutoring services were provided in-kind by the colleges and the adult-education programs. Case management services were provided by the adult-education programs.

#### **Evidence of Impact and Effectiveness**

The adult-education programs in both Hartford and New Haven have reported that they are continuing to use the new Adult Math Transition Course, enabling students to complete the colleges' developmental pre-algebra course while still enrolled in adult education.

For their part, the colleges are continuing to strengthen and expand their partnerships with the adult-education programs. This year, through other funding, Capital Community College was able to bring additional credit courses to the Hartford Adult Education site so that students could begin to explore their career interests and earn college credit. Courses were available in the areas of early-childhood education, business, and medical assisting.

The math bridge curriculum continues to be received positively by both the instructional staff and students in adulteducation programs. Adult-education math is now taught with a curriculum that is aligned with the college math sequence so that students will be better prepared for the postsecondary math taught at the community college. The new math curriculum has also been applied to other adult-education programs at worksites to prepare individuals for postsecondary education. Nick Montano of New Haven Adult Education, said, "The alignment of the curriculum has produced a real connection between the Adult Education sites and the Community Colleges involved in this initiative. The partnership between Adult Education and the Community College has been enhanced to increase student success."

#### **Implications for Practice, Policy and Research**

Practitioners should seek to create a formal continuum of learning from adult education to the community colleges by aligning curricula so that the transition from adult education to post secondary education is seamless and results in increased student success and retention. This would involve designing aligned courses in other subjects so that adult-education students can complete all college developmental-education courses prior to transitioning to postsecondary education.

To that end, the partners in the UCP are planning to develop a similar program to align the adult-education program in English as a Second Language (ESL) with the college language arts curriculum.

Further research directions:

- Review and revise the aligned math curriculum based on additional data gleaned from the post-pilot phase.
- Continue to track all students who complete the aligned math curriculum, and compare their outcomes with those of students who take developmental math courses without the benefit of an aligned curriculum.

Some lessons learned:

- Reinforce the message that instructor and student preparation is key for success.
- Establish concrete expectations of students regarding work load, time management, and goals for the course, and communicate them clearly to the group.

- Solicit positive peer influence to encourage low achievers, as some students with low self-esteem may be motivated by their peers.
- Create a classroom environment and employ activities that encourage and promote students' participation in class.
- Deliver material in a combination of lecture and informal group work. Establish classroom activities to engage students in the process of learning.
- Instruct a concept, rule, theorem, or definition and then immediately apply it. Use real-world applications that are tangible for students.
- Share personal experiences related to the subject matter.
- Select problems and situations in which the student must use his or her critical thinking ability to discuss, reason and effectively solve word problems.
- Have students analyze verbal statements and then translate them into mathematical statements such as expressions, equations, or inequalities.
- Insist on lots and lots of practice, homework and perhaps require a portfolio to show where all the work is being done.