The Perfect Storm: Redesigning Developmental Math at Northern Virginia Community College

Presenters:
George Gabriel, Ph.D., Vice President of Institutional Research, Planning, & Assessment
Beverlee Drucker, Professor of Mathematics
Teresa Ryerse Overton, Professor of Mathematics
Northern Virginia Community College

Thursday, February 7, 2013
5 Campuses and a separate Medical Education Campus in the Suburbs of Washington D.C.

~76,000 Students

~2,600 Faculty and Staff

~8,500 Development Math Students Per Year
NOVA’s Realization

- Cannot fulfill completion agenda without addressing remediation
- No single silver bullet
- Major tool currently available is “redesign”
- Math took the lead, English redesign has begun
Additional Tools

- College readiness programs, summer bridge, in-context learning
- Policy changes that mandate high impact academic practices
- Evidence based decision making with a focus on “continuous improvement

Adapted from P. Terenzini (1999)
In 2007, student success rate in Introductory Algebra – 38%

Other developmental math courses had similar success rates

Within 3 years of entering Introductory Algebra, only 28% enroll in college level courses

Of those only 20% pass a college level course
The Journey

- Representatives from each campus send by administration attended a NCAT conference Nov. 2009 in Nashville
- VCCS State System mandating a change
- College plan – March 2010 NCAT
- NCAT Changing the Equation Grant
Buy-In: The Perfect Storm

Creating a Workable Plan

Sell the Plan

Right Place, Right Time
- Faculty, Administration, and State System all ready for a change

Faculty were consulted on all decisions and at every step along the way
NOVA’s Progression

Team of 13 formed
• 2 Math Faculty from each campus teaching developmental math
• 1 Math Faculty member from ELI
• 1 Instructional Designer
• 1 Dean

Received NCAT Changing the Equation Grant

A common book was selected

Objectives for each unit written
• Based on *The Critical Point* and *Curriculum Guide*
• [www.vccs.edu/deved](http://www.vccs.edu/deved)
NOVA’s Progression (cont.)

- Secured computers from administration
- Chose computer classrooms and labs on each of the five campuses
- Created common documents and assignments with significant input from faculty
- Developed a training program for Faculty
- Assessment questions were selected and was used to gather comparison data between redesign and traditional sections
The Course: MASTEr Math

M - Motivating
A - Academic
S - Success
T - Through
E - Effective
R - Redesign
Shell Courses: What are they?

- Umbrella course when using modules
- Allows students to work on whichever modules they need to study
- Gives students flexibility to work faster than minimum
- Eliminates students needing to register for specific modules
- Eliminates students needing to register every few weeks for a new module
MTT 4

Class is four credits for students, three for instructors (25 students per class)

Students are paying for seat time
Minimum amount of units must be met for course grade
No maximum amount of units in a semester

Address the logistics of scheduling and financial aid

Students receive both units grades and course grade

Also have MTT 1, 2, and 3
## Course Format

| Placement by VPT (Virginia Placement Test) | Multiple exit points depending on credit level course needed | Two hours spent in computer classroom at a set time with their instructor | Two hours spent in Master Math Lab at a set time with their instructor and additional time during open hours | One Custom Textbook for all Units (Two Volumes) | All documents and assignments are common |
Unit Organization

Ten units from what was three courses (no more repeated material)

Each unit consists of:

A MyMathLab pre-test (All units start with the pre-test)

- 80% or higher—student proceeds to next unit pretest
- Less than 80%—student masters the modules and then masters the post-test before going to next unit

3 modules, each with PowerPoint/Videos/Textbook, notes, MyMathLab homework and a MyMathLab quiz

A cumulative MyMathLab post-test
Grading

Points for Everything

Grade is for motivation – Passing Units is the goal

- Notes are 10%
- Homework Assignments are 30%
- Quizzes are 25%
- Tests are 25%
- Classroom and Lab Attendance is 10%

Minimum amount of units must be met for the course grade

No maximum amount of units in a semester (MTT 4)

Students receive both unit grades and course grade
Master Math Lab

Master Math Labs (one per campus) staffed with instructors, instructional assistants, and tutors

Open ~60 hours per week

Students work on homework assignments, take tests and quizzes, and ask questions

Attendance is track – minimum of 2 hours per week

Most campuses have blocks on the computers so students can only work on Math
DMM – Developmental Math Managers

- One on every campus
- Existing Teaching Faculty compensated with reassign time
- Campus representatives in policy decisions (weekly meetings)
- Campus experts on the course – Go to Person
- Train the faculty on the campus and assist them with their courses

Developmental Math Managers
Documentation

Training manual with all information that was discussed

http://www.nvcc.edu/home/toverton/MasterMathTrainingHANDOUTS.pdf

Videos for training

Quick tech training video reminders
Implementation Issues

- Obtaining VCCS approval for shell course structure
- Developing mechanism in Student Information System to track student progress through the modules
- Training the faculty and monitoring their adherence to policies and best practices
- Space for labs
Continuous Improvement

- Deadlines
- Personalized assignment required after each assessment
- Practice tests
- Videos and Textbook requirements
- Notes revamped to be more like a workbook
- Fixed lab time
- Emphasize to instructors the importance of tracking student progress
- PreTests Personalizing Homework
Average Percent Correct on 30 Common Exam Questions

- Spring 2011 Traditional: 60.9%
- Spring 2011 Redesign: 85.4%
- Summer 2011 Traditional: 63.0%
- Summer 2011 Redesign: 89.4%
- Fall 2011: 88.1%
- Spring 2012 Redesign: 88.3%
- Summer 2012 Redesign: 87.7%
- Fall 2012 Redesign: 87.5%
Subsequent Course – Math for Liberal Arts

- All: 66.5%
- No Dev Math: 65.2%
- Traditional Dev Math: 66.5%
- Redesign Dev Math: 72.1%
Subsequent Course – PreCalculus

- All: 55.7%
- No Dev Math: 56.6%
- Traditional Dev Math: 42.8%
- Redesign Dev Math: 63.7%
Overall, I am satisfied with the MASTER Math course.

Overall, I have enjoyed the MASTER Math course.

Overall, my attitude towards Mathematics is now more positive.

Overall, I feel this course is helping me improve my study habits.

The way the class is set up helps me stay on task with learning the course material.

I would recommend this course to my friends.

Student Attitude Survey Answered Agree or Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Fall 2012</th>
<th>Fall 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would recommend this course to my friends.</td>
<td>57.6%</td>
<td>65.2%</td>
</tr>
<tr>
<td>Overall, my attitude towards Mathematics is now more positive.</td>
<td>51.8%</td>
<td>56.8%</td>
</tr>
<tr>
<td>Overall, I feel this course is helping me improve my study habits.</td>
<td>64.5%</td>
<td>66.0%</td>
</tr>
<tr>
<td>The way the class is set up helps me stay on task with learning the course material.</td>
<td>64.1%</td>
<td>68.7%</td>
</tr>
<tr>
<td>Overall, I have enjoyed the MASTER Math course.</td>
<td>57.4%</td>
<td>64.0%</td>
</tr>
<tr>
<td>Overall, I am satisfied with the MASTER Math course.</td>
<td>67.9%</td>
<td>75.9%</td>
</tr>
</tbody>
</table>
Satisfactory Completion Rates: Traditional Arithmetic and Comparable Redesign Group

- Traditional Spring 2011: 44.6%
- Redesign Spring 2011: 59.8%
- Redesign Fall 2011: 61.1%
- Redesign Spring 2012: 62.0%
- Redesign Fall 2012: 63.3%
2012 MTT S and R Grades

MTT 1: 56.5% S, 13.3% R
MTT 2: 37.8% S, 23.9% R
MTT 3: 34.6% S, 18.5% R
MTT 4: 18.3% S, 25.9% R
13.7% of the students in the 4 credit shell course completed more than 4 modules during the semester, a pace which would have been impossible under the traditional model.
We had significantly high costs than expected for coordination and oversight, due to the complexity of a project of this scale at a multi-campus institution ($323 to $336 per student, increase of 6.9%).

Anticipate the per-student cost will go to $297, a reduction of 8%.

Cost Savings

Faculty receive 3 credits for teaching the 4 credit courses.

Due to scheduling patterns for the courses with fewer than 4 credits, we can accommodate more than 25 students in a section, even though at any point in time, the enrollment is limited to 25.
Questions?

Dr. George Gabriel

Beverlee Drucker
bdrucker@nvcc.edu

Teresa Ryerse Overton
toverton@nvcc.edu