MyLab Math in MyLabsPlus educator study reports on Multiple Measures remediation program in Quantitative Literacy course at Stanly Community College

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<tr>
<th>School Name</th>
<th>Timeframe</th>
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<td>Stanly Community College, Albemarle, NC</td>
<td>Fall 2014–Spring 2016</td>
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<th>Course name</th>
<th>Submitted by</th>
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<tr>
<td>Quantitative Literacy with Multiple Measures (MM) Modules</td>
<td>Brigette Myers, Department Head of Mathematics</td>
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<th>Course format</th>
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<tr>
<td>Fully online or hybrid; two-week boot camp at start of semester</td>
<td>Traci Simons, Pearson Customer Outcomes Analytics Manager</td>
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<th>Course materials</th>
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<tr>
<td>MyLab Math in MyLabsPlus with Using and Understanding Mathematics: A Quantitative Approach by Bennett and Briggs (hard copy book optional, code required); supplemented with content from Developmental Mathematics by Martin-Gay</td>
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**Key Findings**

- To boost success and completion rates in the Quantitative Literacy course, Stanly Community College instituted a two-week intervention program using MyLab Math in response to the North Carolina state-wide Multiple Measures policy which exempts select students from placement testing. Course success rates increased 39 percentage points in Fall 2015 and 46 percentage points in Spring 2016.

- All students who completed the MyLab Math pre- and post-tests during the two-week Multiple Measures period saw test scores improve 16 percentage points in Fall 2015 and 18 percentage points in Spring 2016.

- MyLab Math enabled the department chair to offer all students a similar experience by creating one homogenous course across all sections, regardless of instructor or method of delivery, using the coordinator course and course copy features.
Setting
Stanly Community College (SCC) is one of 58 community colleges in the North Carolina Community College System (NCCCS). SCC is located in Albemarle, NC, with a satellite campus in Locust, NC. This institution is accredited by the Southern Association of Colleges and Schools. The college serves over 10,000 students annually in programs including associate degree, diploma, certificate, general education, occupational training, adult literacy, and a comprehensive online degree program. Students enrolled in the curriculum program at SCC during the 2014–2015 academic year were mostly female (71 percent); 68 percent of students identified as Caucasian, and 18 percent identified as African American. Students age 20–24 comprised 26 percent of the population, students under 20 comprised 25 percent, and students age 25–29 comprised 15 percent.

The school's website states, “As of 2013, the curriculum program graduation rate for Stanly Community College is 18 percent. This is 12 percentage points lower than desired.” In addition, the school reports a retention rate* of 58 percent as of June 2014—seven percentage points lower than the institutional goal. While graduation and retention rates aren't where the college would like them to be, course success rates** are more than five percentage points higher than the institutional goal of 75 percent or higher. As of Academic Year 2014–2015, the Stanly Community College Curriculum course success rate is 80.2 percent.

*Retention rates are based on the number of first-time, full-time, degree/certificate-seeking students who enter the institution in the Fall term and who return to the same institution the following term.
**Success rates are determined by the number of students in a course with a “C” or better compared with the total number of students enrolled in the course.

About the Course
The Quantitative Literacy course at SCC is either a 12-week (online) or 16-week (hybrid), three-hour, college-credit course. In the hybrid setting, students spend three hours in the classroom and one hour per week online in MyLab Math and Moodle. Content is delivered through the Moodle learning management system and through MyLab Math in MyLabsPlus. Six chapters are covered (Chapters 2, 3, 4, 5, 7 and 8), each over a one- to two-week period.

The course is designed to engage students in complex and realistic situations involving the mathematical phenomena of quantity, change and relationship, and uncertainty through project- and activity-based assessment. Emphasis is placed on authentic contexts which introduce the concepts of numeracy, proportional reasoning, dimensional analysis, rates of growth, personal finance, consumer statistics, practical probabilities, and mathematics for citizenship. Upon completion, students should be able to utilize quantitative information as consumers and to make personal, professional, and civic decisions by decoding, interpreting, using, and communicating quantitative information found in modern media and encountered in everyday life.

Prerequisites set by the state of North Carolina for the course are: Operations with Integers; Fractions and Decimals; Proportion/Ratios/Rates/Percents; Expressions/Linear Equations/Linear Inequalities; Graphs and Equations of Lines; and Integrated Reading and Writing Ill. Multiple Measures (MM) students are waived from taking these courses and from having to take the placement test. Non-MM students take the placement test and then take the necessary courses indicated from the placement test (or they may place out of all courses and go directly to MAT 143).
The Let's Go Racing module covers all of the prerequisite courses/material except for Integrated Reading and Writing III.

**Challenges and Goals**
When the NCCCS created its Multiple Measures Placement Policy in 2014, community colleges were required to revamp placement procedures for incoming students across the state within two years. Essentially, incoming students who had graduated from high school within the last five years would be waived from placement testing in math and English, if their high school grade point averages (HS GPA) were 2.6 or above. SCC, an early adopter of Multiple Measures, began to admit students using these new rules in Fall 2013. Student success in gateway math courses was assessed during the following Spring 2014 and Fall 2014 terms. Preliminary results suggested that students with a GPA lower than 3.0 who were exempt from placement test as part of the MM program, referred to as Multiple Measure-waivered (MMW) students, were less likely to be successful in their first math course than were their counterparts whose high school GPAs were 3.0 or above.

This lack of success led SCC to create a just-in-time, boot camp-type intervention that would quickly get students up to speed so they could be successful in the Quantitative Literacy course. Aided by a sub-grant from the Gates Foundation, Stanly developed the Let's Go Racing Modules Intervention (RMI). The primary goal of the RMI is to help students succeed by identifying gaps in prerequisite knowledge and subsequently providing appropriate lessons for review and remediation of relevant material. Since Brigette Myers, Department Head of Mathematics, and her colleagues had been using MyLab Math for years, were pleased with the feedback from their students regarding the product, and would be using it in the Quantitative Literacy course, they opted to use MyLab Math for the two-week RMI as well.

**Implementation**
Looking to brand their module and market it to students, SCC instructors looked to North Carolina's well-known auto racing for inspiration. They wanted to stay away from using terms like “pre-test,” “post-test,” and “remediation” since they felt those terms sometimes have a negative connotation to students and instead came up with “Start your Engines,” “Pit Stops,” and “Winner's Circle” for the three phases of the RMI. According to Myers, “Students don't question the module. Rather, they tend to jump in and get started on it the first week because we don't use those terms that they find so scary.” Implementation of the RMI in Quantitative Literacy started in Summer 2015. Students were given access to the RMI through MyLab Math with instructions to complete it the first two weeks of class. Each Let's Go Racing module has three primary sections:

- **Start Your Engines** is a 25-question pre-test delivered in MyLab Math designed to detect prerequisite skill areas in which students need additional training. The test is timed at two hours, and students have one attempt. Coverage includes 4–5 problems covering the following modules: Operations with Integers; Fractions and Decimals; Proportion/Ratios/Rates/Percent; Expressions; Linear Equations; Linear Inequalities; and Graphs and Equations of Lines. Created by Myers and Greg Edwards, Coordinator of Developmental Math, the questions cover the appropriate developmental math material needed for the Quantitative Literacy course.

- **Pit Stops** are instructional modules that address gaps in knowledge and are assigned as a homework within MyLab Math. Students have unlimited attempts on homework
assignments. Students are given a handout (also posted in Moodle) that directs them to the homework problems they should work based on what they answered incorrectly on the Start Your Engines pre-test. Content for these modules comes from the Martin-Gay Developmental Math textbook and MyLab Math course.

- **Winner's Circle** is a post-test that gauges and records changes in knowledge and skill levels. The post-test is a copy of the pre-test with a two-hour time limit and one attempt allowed. This allows instructors and coordinators to determine the increase in content understanding that occurred by taking the RMI. Student performance on the Winner's Circle counts as one quiz grade for the entire course.

After the first two weeks of class and completion of the Let's Go Racing module, students move into the credit-bearing content portion of the MyLab Math course, which includes the following:

**Homework assignments:** There is a required MyLab Math homework assignment for every section covered in the course. Students have an unlimited number of attempts on homework assignments but the assignments must be completed by the due date. There is no time limit on homework assignments.

**Quizzes:** There is a required online quiz for each chapter (with the exception of chapter eight) completed in MyLab Math. Quizzes must be completed by the due date. Students have two attempts on each quiz. The highest grade of the two attempts is used to calculate students’ course average.

**Lab assignments:** There is a required lab assignment for each chapter in Moodle. For the online course, students print the assignment and complete it. They then submit their answers online in Moodle in the corresponding answer entry sheet. Students have one attempt and a one-hour time limit to enter their answers. For the hybrid version of the course, students complete the lab assignment in the classroom in groups.

**Pre-tests:** There is a required pre-test before the midterm and final exam that must be completed online in MyLab Math by the due date. Students have two attempts and a three-hour time limit on each attempt. The highest grade counts towards students’ final grade.

**Exams:** There is a required midterm and final exam that is completed online in MyLab Math by the due date. Students have one attempt on each exam. The exam is timed at two hours.

**Study plan (optional):** While students are not required to answer questions in the study plan, they are encouraged to use it as a resource to assist them in learning the material throughout the course.

**Assessments**

- 23% Chapter quizzes and pre-tests
- 20% Final exam
- 20% Midterm exam
- 20% Homework assignments
- 17% Chapter labs
Results and Data

Beginning Fall 2015, all Quantitative Literacy students were encouraged to complete the RMI, regardless of MMW status; 194 students (97 percent) completed the racing modules over the Fall 2015 and Spring 2016 semesters. Myers believes this impressive statistic is due to faculty discussing the importance of brushing up on content, even if students felt they understood it.

- Average MyLab Math post-test scores were higher than the average MyLab Math pre-test scores in all student groups for both semesters. The target group of MM students with HS GPA 2.6–2.99 performed as follows (figure 1):
  - Fall 2015: Scored 15 percentage points higher on the post-test
  - Spring 2016: Scored 13 percentage points higher on the post-test
- Students in the targeted MM 2.6–2.99 GPA group scored lower percentage point increases pre- to post-test than other student groups, possibly a bi-product of their potentially lower level of preparedness.
- All groups’ MyLab Math post-test scores increased over MyLab Math pre-test scores as follows (figure 2):
  - Fall 2015: 16 percentage points
  - Spring 2016: 18 percentage points

Average pre-test and post-test scores by student group

![Bar chart showing average pre-test and post-test scores for different student groups.](image)

Figure 1. Average Pre- and Post-Test Scores; Fall 2015: Developmental Students (n=40); Placed Students (n=19); MM Students with HS GPA 2.6–2.99 (n=9); MM Students with HS GPA 3.0 or Higher (n=10); Spring 2016: Developmental Students (n=70); Placed Students (n=19); MM Students with HS GPA 2.6–2.99 (n=12); MM Students with HS GPA 3.0 or Higher (n=15)
Average pre-test and post-test scores for all students

![Average Pre-test and Post-test Scores for All Students](image)

Figure 2. Average Pre-test and Post-test Scores for All Students; Fall 2015 (n=78), Spring 2016 (n=116)

Figure 3 shows completion rates and success rates for the target group of students (MM HS GPA 2.6–2.99) before and after the RMI intervention. Before the Let's Go Racing intervention using MyLab Math was implemented fully in Fall 2015, completion rates for students earning a HS GPA between 2.6–2.99 (n=15) averaged 67 percent across Fall 2014 and Spring 2015 semesters, almost the same as the following year’s at 68 percent. However, success rates increased from 33 percent pre-intervention to 55 percent post-intervention, a 22 percentage point increase.

Completion and success rates pre- and post-intervention

![Completion Rates and Success Rates Pre-intervention and Post-Intervention](image)

Figure 3. Completion Rates and Success Rates Pre-intervention and Post-Intervention; Pre: Fall 2014–Spring 2015 (n=6), Post: Fall 2015–Spring 2016 (n=22)
Figure 4 shows that after implementation of the RMI using MyLab Math, student success (ABC) rates among the MM waivered students rose considerably:

- Between Fall 2014 (pre-intervention) and Fall 2015 (post-intervention), success rates rose 23 percentage points for MM Students with HS GPA 2.6–2.99 and 67 percentage points for MM students with HS GPA 3.0 or above, compared to a decrease of Non-MM waivered students of 4 percentage points.
- Between Spring 2015 (pre-intervention) and Spring 2016 (post-intervention), success rates rose 21 percentage points for MM Students with HS GPA 2.6–2.99 and 18 percentage points for MM students with HS GPA 3.0 or above, compared to a 7 percentage point increase for Non-MM waivered students.

**Success (ABC) rates for MM students vs. non-MM students**

![Success rates bar chart](Image)

Figure 4. Success (ABC) Rates for MM Students by Group vs. Non-MM Students; Fall 2014: MM HS GPA 2.6–2.99 (n=3), MM HS GPA 3.0 or Above (n=6), Non-MM (n=18); Fall 2015: MM HS GPA 2.6–2.99 (n=9), MM HS GPA 3.0 or Above (n=10), Non-MM (n=60); Spring 2015: MM HS GPA 2.6–2.99 (n=3), MM HS GPA 3.0 or Above (n=11), Non-MM (n=29); Spring 2016: MM HS GPA 2.6–2.99 (n=13), MM HS GPA 3.0 or Above (n=15), Non-MM (n=89)

**The Student Experience**

Student feedback to instructors has been positive, including these student quotes collected by the department in Fall 2015:

- “I believe the Pit Stops were a good use of my time. They helped trigger some of the things I was taught in high school and had forgotten.”
● “I think it [Start Your Engines Quiz] is a great way to show how prepared a student is for the course.”
● “The Pit Stops were very helpful in making sure each student covers what they’ve missed in order to succeed in the class without going over what they already know to make the most of their time.”

Conclusion
Stanly Community College’s RMI is a unique approach to getting students up-to-speed in the developmental prerequisite knowledge needed for the Quantitative Literacy course. The department has found the module implementation to be cost-effective for both the college and the student. According to Brigette Myers, Department Head of Mathematics, “The module was fairly easy to build and implement since both our developmental and curriculum math courses were already using MyLab Math.”

Overall, Myers has found MyLab Math to be a very positive experience because the instructors and students typically find it to be very user-friendly. “MyLab Math has made my job much easier as both an instructor and as the head of the math department,” states Myers. “All sections of each course use the same assignments which helps provide homogenization across course sections.” The department is happy with the results from the intervention, and no immediate changes are planned.