

# MyMathLab in MyLabsPlus educator study measures homework completion and course success in the Developmental Math sequence at Southcentral Kentucky Community & Technical College

<p><b>School name</b> Southcentral Kentucky Community &amp; Technical College, Bowling Green, KY</p> <p><b>Course names</b> Pre-Algebra, Basic Algebra, and Intermediate Algebra</p> <p><b>Course formats</b> Face to face, online, flipped, hybrid, lab based</p> <p><b>Course materials</b> MyMathLab in MyLabsPlus with <i>Developmental Mathematics</i> by Martin-Gay; Emporium Workbook: <i>Preparing Students for Success in College Mathematics</i> by the SKYCTC math faculty</p>	<p><b>Timeframe</b> Fall 2015</p> <p><b>Submitted by</b> Claudean Ellis, Instructor</p> <p><b>Results reported by</b> Julianne Labbiento, Pearson Customer Outcomes Analytics Manager</p>
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## Key Findings

- Pass rates for students who completed all of the modules in their courses were 92% for Pre-Algebra, 92% for Basic Algebra, and 97% for Intermediate Algebra for the analysis period.
- Homework scores and quiz scores were very strongly correlated in Basic Algebra. In addition, test scores were strongly correlated with both the number of homework assignments completed and homework scores in Basic Algebra.
- Data indicate that students were able to accelerate their learning through the sequence of courses, completing more than one course in a semester.

## Setting

[Southcentral Kentucky Community & Technical College](#) (SKYCTC) in Bowling Green, Kentucky, is part of the [Kentucky Community & Technical College System](#). The college has been operating for over 75 years, serving a ten-county radius with six campus locations. Students can earn a degree, diploma, or certificate in one of 19 programs. The college maintains a close relationship with business and industry, and small classroom sizes mean that faculty can provide students with individualized instruction and personal attention. In 2014, SKYCTC served approximately 5,000 students, with [16%](#) of students identifying as minorities.

## About the Course

Three courses comprise the developmental mathematics sequence at SKYCTC: Pre-Algebra (MAT 55), Basic Algebra (MAT 65), and Intermediate Algebra (MAT 85). Students are placed into the appropriate course after completing the COMPASS placement exam, per KCTCS guidelines.

The Pre-Algebra course topics include, but are not limited to, the following concepts: operations on integers, decimals and fractions, exponents, square roots, percents, ratios, proportions, prime factorization, basic geometry, algebraic expressions, basic linear equations, and applications. This three-credit hour course requires MyMathLab as an online learning component, and the final grade can be A, B, C or F.

The Basic Algebra course includes, but is not limited to, the following concepts: linear equations and inequalities, integer exponents, polynomials, factoring, equations of lines and their graphs, systems of linear equations, and applications. A grade of C or better in Pre-Algebra or the required COMPASS placement test score is a prerequisite for taking this three-credit hour course. The course also requires MyMathLab as an online learning component, and the final grade can be A, B, C, or F.

The Intermediate Algebra course content includes, but is not limited to, the following concepts: rational expressions, radical expressions, rational exponents, graphing parabolas, inequalities, equations of lines, functions and applications, with an emphasis on solving quadratic, rational, and radical equations. Students must have either earned a C or better in Basic Algebra or the required COMPASS placement test score. This course is also three credit hours and requires MyMathLab as the online learning component. Final grades are given as A, B, C or F.

Students in these developmental courses may also be awarded a grade of MP, indicating that they have made significant progress by completing at least two modules of the course and have not missed more than five days of class. When the student re-enrolls in the course in the next semester, the completed modules are imported and they are able to continue with their coursework. The grade of MP has no value in computing grade point average.

## Challenges and Goals

In 2009, prior to redesign, all three developmental math courses at SKYCTC were strictly lecture based. Students only used MyMathLab for homework. Instructor Claudean Ellis says that many students were taking at least a year or more to get out of the transitional courses. In 2010, the math department divided themselves into three groups, with faculty working in pairs on each of the three courses and their associated workbook portions. The goal was to create a course structure that gave students the flexibility to progress more quickly through the developmental content, while

maintaining student success. The redesigned courses allow students who finish MAT 55 or MAT 65 before the end of the semester to immediately start working in the MAT 65 or MAT 85 course, respectively.

## Implementation

Each of the developmental mathematics courses at SKYCTC is broken into modules. All are delivered through MyLabsPlus using MyMathLab in an emporium format. Learning materials for lessons in each course include a multimedia textbook, an interactive lesson presentation, audio lecture, and other resources in MyMathLab. Quizzes and homework may be completed at home, but module exams and the final exam are proctored. SKYCTC has a 50-seat emporium lab on its main campus. Classes there are capped at 40 students, with the 10 extra computers available for testing. Other campuses have smaller rooms.

Each of the three courses is comprised of modules: Pre-Algebra and Basic Algebra each have six modules, with Intermediate Algebra having five modules. Each module contains at least one homework assignment and quiz. A pacing guide is provided, and students not completing homework, quizzes, and exams on or before the due dates receive scores of zero for those assignments.

- Homework requires a minimum score of 95%, quizzes require an 80%, and module exams require a 70% to achieve mastery level.
- Quizzes may be retaken three times, and exams may be attempted twice before additional remediation, such as the use of links on Blackboard for students to get into Khan Academy or attendance at the learning center. Remediation is prescribed by the instructor on an individual basis.
- While module exams are designed to be taken at the end of each module, students may choose to begin a module by taking the module exam; if they earn at least 70% on the exam, they are allowed to skip the remaining module requirements and move to the next module.

Students are also required to purchase the Emporium Workbook: Preparing Students for Success in College Mathematics, created by SKYCTC math faculty to provide extra guidance for students completing course modules. The workbook is aligned with the modules and provides examples, definitions, helpful hints, and Your Turn exercises. These assignments must be completed in the workbook and solutions entered in the MyMathLab homework assignments.

Each course concludes with a final exam. Students have one attempt on the final exam, and it must be taken to receive a passing grade for the course. Final exams in all three courses are proctored and may be taken only once at a KCTCS testing center. Students are allowed two hours to complete the final exam, and a scientific calculator is allowed.

Students are provided a pacing guide detailing the minimum suggested pace that they should maintain in order to complete all course modules and finish by the end of the semester. Only students who finish all required modules may sit for the final exam; students who do not complete all modules are awarded a final grade of MP and are able to transfer any fully-completed modules to the same course when retaken at SKYCTC in the emporium format. Students who complete the MAT 55 or MAT 65 final exam early are able to immediately continue on to the next course. If students

are able to complete more than one of these three courses in the same semester, they earn credit for the “bonus” courses tuition-free.

## Assessments

SKYCTC’s developmental math courses stress that assessment is a valuable part of the overall success of a student. Assessments are used to determine areas of strength and weakness within the courses. Grades are posted in the [MyLabsPlus gradebook](#) and can be viewed anytime during the semester.

<p>Grades are determined by the following percentages:</p> <ul style="list-style-type: none"> <li>● 40% Module exams</li> <li>● 30% Final exam</li> <li>● 20% Homework</li> <li>● 10% Quizzes</li> </ul>	<p>Letter grades are based on the following scale:</p> <p>A: 90 to 100%</p> <p>B: 80 to 89%</p> <p>C: 70 to 79%</p> <p>F: Below 70%</p>
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A passing grade is an A, B, or C and can only be made with full completion of all course modules and the final exam. Grades of MP (Making Progress, available in Basic Algebra and Intermediate Algebra) and F are not passing grades.

## Results and Data

Students showed great success in all three of the courses. The pass rate was 92% for students who completed all of the modules in the Pre-Algebra (MAT 55) and Basic Algebra (MAT 65) courses. Students in the Intermediate Algebra (MAT 85) course who completed all of the modules posted a 97% pass rate. Figures 1 and 2 display the pass rates for students completing all modules in each course and the final course grade distribution by course, respectively.

### Pass rates by course

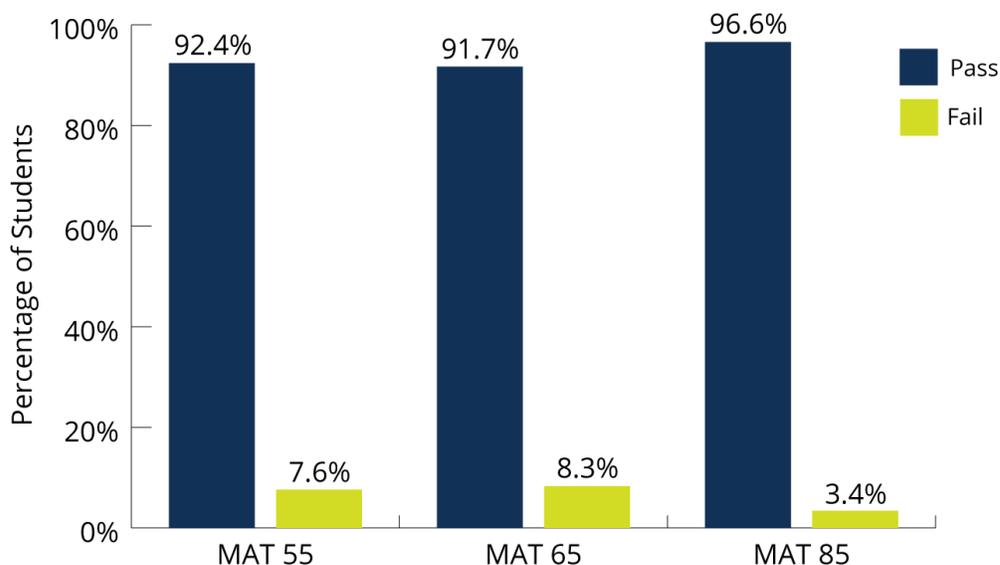


Figure 1. Pass Rates for MAT 55 ( $n=66$ ), MAT 65 ( $n=60$ ), and MAT 85 ( $n=58$ )

### Final course grade distribution

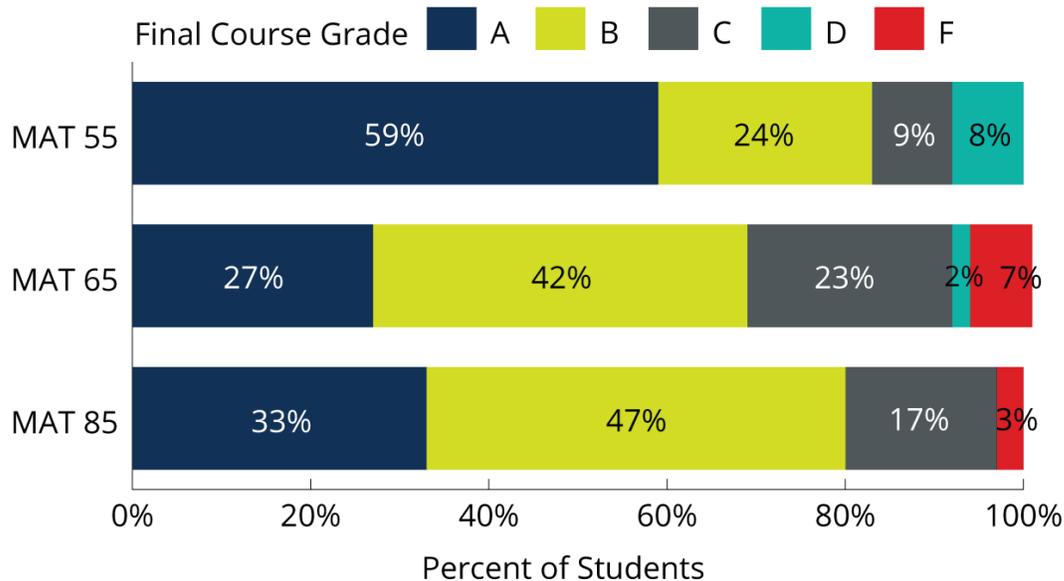


Figure 2. Final Course Grade Distribution by Course: MAT 55 ( $n=66$ ), MAT 65 ( $n=60$ ), and MAT 85 ( $n=58$ )

In addition, MP (Making Progress) grades were awarded to 17% of students enrolled in MAT 55, 45% of students enrolled in MAT 65, and 35% of students enrolled in MAT 85, indicating that those students had successfully completed a portion of the modules for their courses. Withdrawal rates in the courses were very low, with just 2% of MAT 55 students, 7% of MAT 65 students, and 8% of MAT 85 students earning grades of W for their courses.

One of SKYCTC's goals for redesign was to provide students with the opportunity to accelerate through the three courses in one semester. Students who were able to accelerate, but not completely finish all modules in their next course, were also able to retain their status and pick up where they left off the following semester. Student performance towards this goal during Fall 2015 is summarized below:

For students starting the sequence in MAT 55:

- 12 students completed MAT 55 and completed one to five of the six modules of MAT 65
- 2 students completed all three courses: MAT 55, MAT 65, and MAT 85

For students starting the sequence in MAT 65:

- 1 student completed MAT 65 and completed four of the five modules of MAT 85
- 8 students completed both MAT 65 and MAT 85

A correlation measures the strength of a relationship between two variables, where  $r$  is the correlation coefficient. The closer a positive  $r$  value is to 1.0, the stronger the correlation. The corresponding  $p$ -value measures the statistical significance or strength of the correlation, where a  $p$ -value  $< 0.01$  shows the existence of a positive correlation between these two variables. Note that correlation does not imply causation; it is simply a measure of the strength of the relationship.

An analysis of homework scores and quiz scores showed a strong correlation between those scores in the Pre-Algebra course and also when all course results were combined. A similar comparison resulted in a very strong correlation when data from homework scores and quiz scores in the Basic Algebra course were assessed. Finally, test scores were strongly correlated with both the number of homework assignments completed and the homework scores in the Basic Algebra course.

Correlations are shown in Table 1 and Figure 3.

	MAT 55	MAT 65	MAT 85	All Courses
Number of Homework Assignments to Quiz Score	0.59*	0.47	0.43	0.41
Homework Score to Quiz Score	0.66* *	0.81***	0.52*	0.69**
Number of Homework Assignments to Test Score	0.57*	0.61**	0.41	0.52*
Homework Score to Test Score	0.50*	0.73**	0.45	0.48

Table 1. Correlations in MAT 55 ( $n=66$ ), MAT 65 ( $n=60$ ), MAT 85 ( $n=58$ ), and All Courses Combined ( $n=184$ )  
 \*\*\*very strongly correlated, \*\*strongly correlated, \*moderately strongly correlated.

### Correlation between homework and quiz scores in MAT 65

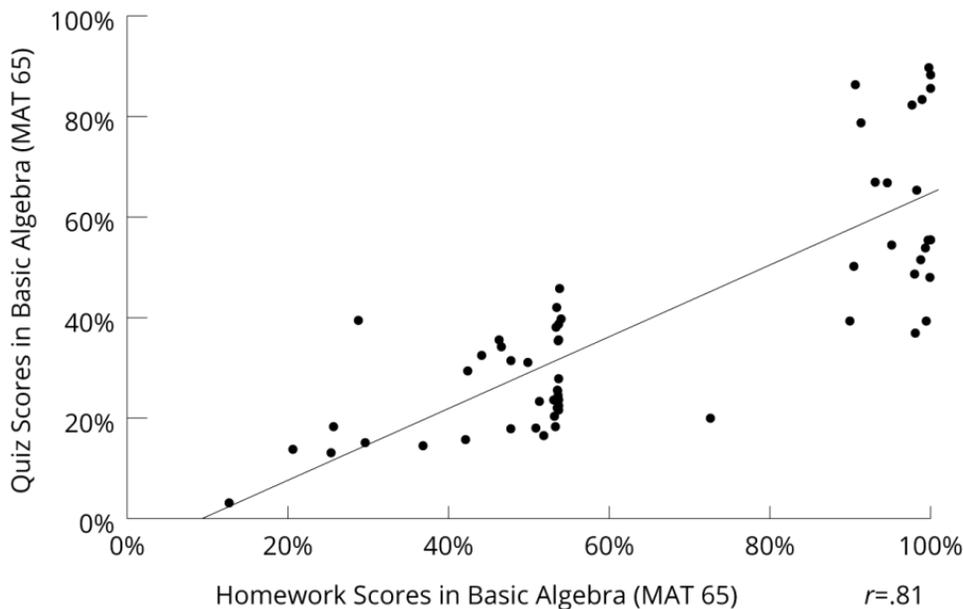


Figure 3. Correlation between Homework Scores and Quiz Scores in Basic Algebra ( $n=60$ )

## The Student Experience

At the end of the semester, students were asked to complete a post-semester survey. While the response rate was very low (4% response rate), students responding made several comments regarding their experiences with using MyMathLab for the courses.

How has MyMathLab impacted your learning in this course?

- *"It gave me an understanding of what I should be learning and opportunities to learn."*
- *"It helps me go step by step instead of rushing."*

What do you think are the benefits of using MyMathLab?

- *"Being able to redo the homework and quiz more than once. The [availability] of more than one example or set of instructions on how to solve the problems."*
- *"For students who can use it well, I believe they are numerous, you can work on math anywhere, it give examples and even a tab that works it out with you then you receive a new problem."*
- *"I like the structure that it provides for learning."*

## Conclusion

By creating an emporium course, the math faculty achieved their goal of offering students flexibility to progress through the developmental course sequence, while maintaining student success. In taking any of the three developmental mathematics courses at SKYCTC, students rely on MyMathLab for various assessments. Results show that students have embraced the inclusion of the technology, with high pass rates and a substantial proportion of students earning final grades of A or B. Data also show that both the level and quantity of homework completion have an impact on quiz scores, test scores, and final course grades. In addition, Ellis reports that many students were able to complete at least two courses and a couple of modules in the next course in one semester. Some students have even started in the MAT 55 course and completed all three courses in one semester. Ellis looks forward to continuing to update the implementation model at SKYCTC as students' needs change.