

# MyLab Math with MyLabsPlus educator study examines homework impact in Developmental Math I & II at Pensacola State College

<p><b>School name</b> Pensacola State College, Pensacola, FL</p> <p><b>Course name</b> Developmental Math I &amp; II</p> <p><b>Course format</b> Emporium</p> <p><b>Course materials</b> MyLab Math in MyLabs Plus for <i>Prealgebra and Introductory Algebra</i>, 4th Edition by Martin-Gay</p>	<p><b>Timeframe</b> Fall 2016–Spring 2017</p> <p><b>Submitted by</b> Kathryn Merritt, Associate Professor</p> <p><b>Results reported by</b> Julianne Labbiento, Customer Outcomes Analytics Manager</p>
--	---

## Key Findings

- Students' module PostTest scores improved an average of 40 percentage points from their module PreTest scores.
- Students who earned higher MyLab homework scores showed greater improvement between module PreTests and PostTests.
- Students who scored higher on MyLab homework earned higher final course scores.

## Setting

[Pensacola State College](#) (PSC) is a public, comprehensive community college serving both traditional and non-traditional students in Northwest Florida and Southern Alabama. Since its founding in 1948, enrollment has grown from 136 students to over 26,000 students attending at six locations. PSC offers more than 100 programs of study, including associate in arts and associate in science degrees, career-oriented certificate programs, and three bachelor's degrees: a bachelor in applied science in business and management, a bachelor of applied science in cybersecurity, and a bachelor of science in nursing. For students earning AS degrees and career-oriented certificates, job placement is [nearly 100 percent](#) in many technical areas. Students earning AA and AS degrees have guaranteed transfer to any of Florida's 12 state universities. Approximately one-third of students attend PSC full-time, with 61 percent of students identifying as female and 31 percent as minorities.

## About the Course

There are two courses in the developmental math sequence at PSC. Students earning [P.E.R.T. Mathematics](#) scores of 50–95 matriculate into Developmental Math I (MAT 0018), while students who earn 96–113 may enroll in the Developmental Math II (MAT 0028) course. Each course meets for three hours per week and is worth three credits.

**Developmental Math I** is designed for students who have little or no algebra background. The major topics in the course are operations with signed numbers, fractions, decimals, ratios and proportions, percent, and geometric figures. The prealgebra topics include properties of signed numbers, simplifying polynomials, and solving equations. Students must earn a grade of C or higher in order to advance to the next mathematics course, Developmental Math II.

**Developmental Math II** is a math course for students who have had some previous algebra instruction and it provides the algebra skills needed for success in Intermediate Algebra, a college credit gateway course. The major topics include signed numbers, algebraic expressions, exponents, polynomials, factoring polynomials, linear and quadratic equations, rational and radical expressions, and an introduction to graphing. Students must earn a grade of C or higher in order to advance to Intermediate Algebra.

## Challenges and Goals

When the state of Florida litigated that changes must be made to developmental education and decided to allow more students to skip developmental courses altogether, instructors at Pensacola State College were faced with the challenge of getting the most underprepared students (those with a P.E.R.T. math placement score below 113) through the course sequence. Thus, the Title III-funded Developmental Students Redesign Project aimed to improve student success, persistence, and learning through the implementation of a redesigned curriculum that addressed students' differing gaps in knowledge while bringing them all to the level of mastery needed to move on to their next course.

## Implementation

PSC's developmental math sequence is taught using the emporium method. All of the course materials are delivered via MyLab™ Math in MyLabsPlus™, with each course divided into six modules. These personalized instruction courses allow each student to skip modules in which they can demonstrate mastery and concentrate on those containing topics where they have difficulty. Students work through structured assignments under the guidance and support of an instructor and an assistant in a computer lab/classroom. Classes formally meet for three hours per week, but to successfully finish the course within one semester, several additional hours working on the course assignments outside of class are required. Students are encouraged to spend time in the [Math Labs](#) where tutors are available. Students who complete the Developmental Math I course before the end of the semester may begin Developmental Math II immediately. Those completing the Developmental Math II course before the end of the semester may exit the course upon completion. In addition to the MyLabsPlus access code, each student must also keep a three-ring binder exclusively for math work. The math binder must be brought to class each day, and students are instructed to keep all course documents, lecture notes, and homework problems orderly in the

notebook. Students are also required to bring their own headphones to effectively view and listen to the video lectures, animations, and PowerPoint presentations. Calculators are not permitted in either course.

Professor Kathryn Merritt says that a pacing schedule is provided, showing the minimum work students need to complete in order to finish the course in one semester. Students are encouraged to work ahead of the pacing guide so that additional time is available to work on difficult topics, to repeat quizzes and tests, and to attend lecture/review sessions.

Each course module begins with the student completing a PreTest in MyLab. PreTests may either be taken in the computer classroom or in the testing center and are password protected. Students have only one attempt at the PreTest, and the score does not count towards their grade, rather it determines whether or not the student must complete the module. With scores of 80 percent or higher on the PreTest, students are exempt from the module content and may move immediately to the next module's PreTest.

Students scoring less than 80 percent on a PreTest are required to complete that module. Their first task is to watch all of the module lecture videos in MyLab, taking detailed notes and working all practice problems neatly in their notebooks. Homework assignments may be practiced multiple times, and exercises must be corrected until at least 80 percent are correct. The Similar Exercise learning aid allows the opportunity to continue to practice exercises until 100 percent mastery is achieved. The highest score earned on each homework assignment is counted towards the course grade.

After all module homework exercises are completed, a module review quiz must be taken. The quizzes do not require a password and can be taken in or out of class. Two attempts are allowed on the quizzes, and students may use their notes, though they are encouraged to keep note use to a minimum. Based on the review quiz results from the first attempt, [personalized review homework](#) is assigned and must be completed until at least 80 percent is achieved. The quiz may then be attempted again, with the highest score earned on each review quiz counting towards the course grade.

When all module homework and quizzing is complete, the student takes a PostTest on the module. PostTests require a password and must be taken and completed in the classroom or the testing center. Three attempts are allowed on each PostTest, and students may not use any notes or receive help. If the PostTest grade is below 70 percent, the student must complete the [Companion Study Plan](#) exercises to a score of at least 80 percent before a retake is allowed. The highest score earned on each PostTest is counted towards the course grade.

After the completion of all modules and the final exam review homework, students take a 30-question, multiple-choice final exam based on all the course competencies. Only one attempt is given, and students are not allowed to use a calculator, notes, or receive help. Students have two hours to complete the final exam.

Faculty have employed several MyLab features in the courses to guide students toward success. In addition to the [personalized homework](#) and [prerequisites](#) to ensure mastery, Merritt says that PSC also utilizes the [lockdown browser](#) feature in MyLab during PostTests in an effort to protect

academic honesty. The [coordinator course](#) feature is also employed to guarantee that course delivery is consistent across all sections.

## Assessments

- 50% MyLab PostTests
- 25% MyLab final exam
- 15% MyLab homework
- 10% MyLab quizzes

Since Developmental Math I and II are preparatory courses at PSC, no Ds are given and Fs are only given on the third attempt. If a student does not meet the requirements to earn a C or better, an N is given, meaning “no credit.” Final grades are based on the following scale:

- 90–100% A
- 87–89% B+
- 80–86% B
- 77–79% C+
- 70–76% C
- Below 70 N

## Results and Data

With pass rates of 99 percent in each course for students who took the final exam, Merritt and her team had an intuition that their model was good. Faculty were further interested in learning whether the homework and quizzes assigned in MyLab were effective in filling the gaps in knowledge as students worked through module content on their way towards their final exams. PreTest and PostTest scores were analyzed for students who were required to complete work in modules (ie. did not test out of a module).

- Students taking the Developmental Math I course improved their scores an average of 34 percent and students taking the Developmental Math II course improved their scores an average of 43 percent (figure 1).
- Results of a *t*-Test show statistical significance for the difference in average PreTest and PostTest scores for both courses. Developmental Math I:  $t(413) = -18.30$  and  $p < .001$  and Developmental Math II:  $t(678) = -38.93$  and  $p < .001$ .

## Average module PreTest and PostTest scores

Figure 1. Average Module PreTest and PostTest Scores, Fall 2016 and Spring 2017, Dev Math I ( $n=415$ ); Dev Math II ( $n=680$ )

Digging deeper into this analysis, the average PreTest to PostTest improvement for all students in Figure 1 was calculated as 40 percent. Students in the sample were then broken down into two groups: those who showed improvement  $<40$  percent and those who showed improvement  $\geq 40$  percent. When average MyLab homework scores were analyzed for these two groups, data show that students demonstrating improvement  $\geq 40$  percent on PostTests earned MyLab homework scores nearly twice as high as students in the other group, results that were statistically significant where  $t(1,093)=42.11$ ,  $p<0.001$  (figure 2).

## Homework average by module PreTest/PostTest improvement

Figure 2. Homework Average by Module PreTest/PostTest Improvement, Fall 2016 and Spring 2017 ( $n=1,095$ )

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  $< 0.001$  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 MyLab homework scores and final course scores (figure 3) shows a very strong correlation between the two assessments ( $r=0.95$ ,  $p<0.001$ ). It should be noted that homework contributes 15 percent towards final grades, which may impact this relationship.

### Correlation between MyLab homework scores and final course scores

Figure 3. Correlation between MyLab Homework Scores and Final Course Scores, Fall 2016 and Spring 2017 ( $n=1,255$ )

## The Student Experience

The following results are from the national Pearson student MyLab Math survey, taken by 32,192 students in Spring 2017 from both two-year and four-year schools:

- 78 percent of respondents reported that MyLab Math helped them learn their course's content.
- Over 75 percent of respondents reported that they had either a good or very good experience with both MyLab Math homework and learning aids.
- 75 percent of respondents said that they had a good or very good experience with the eText.
- 89 percent of respondents indicated that they were likely to recommend MyLab Math to a friend.

## Conclusion

When PSC first piloted its developmental math course redesign in Fall 2012, Merritt noted, “When we can get the mindset changed with our students and even some of our instructors, I think our rates will get better.” The use of a coordinator course ensured consistency, and prerequisites and personalized homework helped to address the variety of individual student needs. With completers’ pass rates at 99 percent, focus has now turned to analyzing the intermediary assessments and activities as students move through the developmental course sequence, as well as subsequent course success in the Intermediate Algebra course for those who have moved on to credit math.