

MyLab Math educator study profiles instructor and student engagement in Elementary Algebra at Delaware Technical Community College

School name Delaware Technical Community College	Timeframe Spring 2017
Course name Elementary Algebra	Educators Kim Gregor, Instructor and Departmental Chair, Wilmington campus Kathy Vezmar, Instructor and Departmental Chair, Owens campus
Course format Hybrid: Lecture and lab	Results reported by Julianne Labbiento, Pearson Customer Outcomes Analytics Manager
Course materials MyLab Math in MyLabsPlus for <i>Beginning and Intermediate Algebra</i> by Martin-Gay	

Key Findings

- On average, 77 percent of students who attempted chapter tests passed them.
- Chapter quizzes and corresponding chapter tests show strong and moderately strong correlations.
- Faculty using the MyLab dashboard are alerted to at-risk student behavior, motivating them to engage students just in time and help lead them to success.

Setting

[Delaware Technical Community College](#) (DTCC) is a statewide, multi-campus community college in Delaware that is committed to providing affordable, open admission, post-secondary education that is relevant and responsive to labor market and community needs. The college offers comprehensive educational opportunities that contribute to the economic vitality of the state, including career, general, developmental, and transfer education; workforce development; and lifelong learning. DTCC is committed to fostering student success in higher education as a means to economic and personal advancement. According to a [Fall 2015 report](#), DTCC had a total enrollment of over 13,000 students, with 62 percent of students reporting as female, 56 percent as Caucasian, and 25 percent as African American. Approximately 65 percent of students attended part time.

About the Course

This study documents the implementations of MyLab Math in Elementary Algebra at two DTCC campuses — the Wilmington campus and the Owens campus in Georgetown. The Elementary Algebra course at DTCC is a four-credit, hybrid course offering a review of solving and graphing linear equations and inequalities, as well as systems of linear equations and inequalities, polynomials, factoring, rational expressions, radical expressions, and quadratic equations as applied to a variety of applications, including geometry. Core Course Performance Objectives (CCPOs) include:

1. Solve linear equations and inequalities algebraically and graphically;
2. Solve systems of linear equations and inequalities algebraically and graphically;
3. Perform arithmetic operations on polynomial expressions;
4. Apply factoring techniques to simplify rational expressions;
5. Solve quadratic equations; and
6. Evaluate functions graphically and algebraically.

Students must demonstrate proficiency on all CCPOs at a minimal 75 percent level to successfully complete the course. In addition to the Martin-Gay text and MyLab™ Math access code, a basic calculator is required.

Challenges and Goals

Kim Gregor and Kathy Vezmar are instructors and department chairs at the Wilmington and Owens campuses of DTCC, respectively. Long time users of MyLab Math, they note that their developmental courses have undergone several major redesigns. Years ago, DTCC's developmental math courses were offered in a hybrid format. Results were fairly good, but the decision was made at the administrative level to switch to an emporium format to further improve success rates. The new emporium model included no deadlines, unlimited attempts on assignments, and little instructor contact in the classroom. While it did initially achieve its goal of increasing success, as continued tweaks were made to the course to accommodate the wishes of all of the instructors on all of DTCC's campuses, the courses became lengthy and cumbersome, with too many assignments and assessments for the timeframe in which it was to be delivered. The model also provided more flexibility and freedom for the student, with students able to carry their unfinished work over to the following semester and pick up where they left off. But often, students took advantage of that offer, not realizing that in doing so, they earned failing grades for the beginning semester. Faculty grew unhappy with the success rates and felt that it was time for a change.

A return to redesign

It was at that point that faculty decided to return to a hybrid model for their Elementary Algebra course, similar to what they had used in the past, but updated with some of the newer features available in MyLab. Kathy Vezmar says, "We had been using MyLab for over ten years, as both MyLab Math and in MyLabsPlus, but we were using the courses 'the old way.' MyLab had come along with customizable assignments and diagnostics, and we weren't taking advantage of the power that the program now had." With their new implementation, they hoped to keep students on track with due dates, increase instructor and student engagement, and ultimately increase pass rates on assessments within the course.

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Implementation

The faculty decided to start from ground zero. First, they assessed and reorganized all of the developmental course objectives into a more natural and cohesive order, eliminating repetition and overlap that may have slowed students down. Next, they chose a new textbook, with a voice more closely matched to the way they taught and the way their students learned. They built an associated MyLab course that delivered what they wanted, in the order they wanted. Finally, they incorporated a system for identifying at-risk students using the MyLab dashboard.

Students now attend classes that are half lecture and half lab. Some classes are held in computer classrooms; other classes start in a traditional lecture room, then move to a computer lab. Gregor prefers the latter, saying that while the movement takes up a few minutes of time, she likes that students are not distracted by the computers for the lecture. She says that her class days usually begin with a review of the previous homework, a 40-minute lecture, and perhaps a bit of review or an activity, such as a worksheet, time permitting. Once students are in front of their computers, they work on MyLab homework, quizzes, or tests. While faculty have freedom to present the course material as they wish, a [coordinator course](#) ensures consistency in MyLab.

Students begin each new chapter with a proctored, password-protected chapter diagnostic in MyLab. This diagnostic, which is only taken once per chapter, does not count towards their grade, but does [personalize their homework assignments](#) for the chapter. Homework is assigned by section and students must earn at least 60 percent in order to advance to the next homework. They have unlimited attempts with all [learning aids](#) turned on, and their final attempt is counted into the overall score. Students, sharing their comments in a voluntary student survey, appreciated the unlimited attempts, with one student saying, “If I am struggling with a section, I can request unlimited questions within that section to help prepare me.”

Quizzes are proctored and password protected and cannot be taken until a student has earned at least 75 percent on all section homework. Students have only one attempt on quizzes. Quizzes were designed to prepare students for the chapter tests. One student agreed, “The quizzes were awesome! They were so challenging and prepared me very well for each test.”

Proctored chapter tests are first given as pencil-and-paper tests. Students failing to earn at least 75 percent on the test are directed to complete the [Companion Study Plan](#) (CSP) in MyLab. The CSP is personalized for the student based on quiz results from the chapter. Students needing to complete the CSP have unlimited attempts, with all learning aids turned on. It does not count towards their grade, but successful completion at 80 percent or higher allows the students to retake the chapter test. The second attempt of the test is delivered in MyLab, rather than as paper and pencil. Some campuses also give a paper-and-pencil final exam, which counts as a test.

In addition to the lecture component, there have been several other changes from their emporium implementation. In DTCC's current hybrid implementation, due dates have been added on all assignments. Gregor and Vezmar share that initially, there was resistance to due dates among both faculty and students, coming from a previous emporium implementation that had none, but the faculty have grown to love them and feel they are critical and effective in moving students through the curriculum at the developmental level. Another change involves the final exam for the campuses that require it. According to Gregor, past implementations have always dictated that students complete the final exam, but now, students passing all assessments in no more than two attempts can have their final exam waived.

Finally, the biggest change is the use of two MyLab dashboards. The [Reporting Dashboard](#), available in all MyLab Math courses, provides a way to compile student data from multiple courses and sections and generate reports about overall student performance, performance on assignments including time spent, and even information about the objectives that have been mastered. DTCC supplements this dashboard with an Early Alerts & Interventions Dashboard with Predictive Analytics, an additional paid service that is programmed to the specifications of the institution. This dashboard identifies students who may be at risk of not passing the course, using predictive analytics based on historical data for the course, and alerts the faculty member so that they can determine the best approach to get those students back on track. Vezmar says, "Sometimes developmental students just disappear. We needed a way that would help us hang on to these students. I think the dashboard helps us do that." She notes, "The more we use the dashboard, the more we interact with our students, the better our students are doing."

Dashboard alerts are generated automatically to MyLab when a student registers an Incomplete on any assignment or when they fall below a score of 75 percent on a section homework, quiz, paper-and-pencil test, or MyLab test. Using the dashboard, instructors can see how many of their students are predicted to pass and can then adjust the level, direction, type, and frequency of interventions with them accordingly. One student noted, "[The intervention] helped me a little to understand my situation," while another said, "[The interventions] motivated us to keep getting our work done on time so we didn't fall behind or have to retake the class again." Gregor shares, "I love the dashboard! It records everything right in MyLab, it's easy for instructors to use, and it gives us data to go to our administrators at the college and show that we're doing everything we can to help our students. We wish we could have the dashboard in all of our classes!" Vezmar agrees, adding, "It's changing the way we view the instructor interactions and students interactions. It give us a different visual that we haven't had before." She also notes that the interventions promote healthy competition between faculty and campuses, as instructors become more motivated to engage at-risk students and lead them to success.

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—Student, Delaware Technical Community College

Assessments

While each campus assigns homework, chapter quizzes, and chapter tests, not all campuses give a final exam. The weights assigned to the assessments are as follows:

- 80% MyLab Math tests (including the final exam, if applicable)*
- 10% MyLab Math homework
- 5% MyLab Math quizzes
- 5% Classroom activities

*NOTE: First attempts on tests are given as paper and pencil; second attempts are delivered in MyLab. Final exams are paper and pencil.

In addition, all campuses are consistent in the requirement that students must demonstrate proficiency on all CCPOs at a minimum of 75 percent to successfully complete the course. Grades are determined using the DTCC grading system: **A** 100–92 | **B** 91–83 | **C** 82–75 | **F** 74–0

Results and Data

Correlations were used to examine the relationship between chapter quiz performance and corresponding chapter test performance, beginning with Chapter 2. 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. Positive correlations are considered moderately strong if they fall between 0.50 and 0.59 and strong if they fall between 0.60 and 0.79.

Figure 1 displays the strong correlations found for nearly all chapter quizzes and chapter tests, with only two exceptions — Chapter 6 and Chapter 9 — which had moderately strong correlations. Note that objectives from Chapters 10 and 11 were assessed together as a single quiz and that only one chapter test was given covering material and objectives from Chapters 8–11.

Correlation between chapter quiz and chapter test performance*

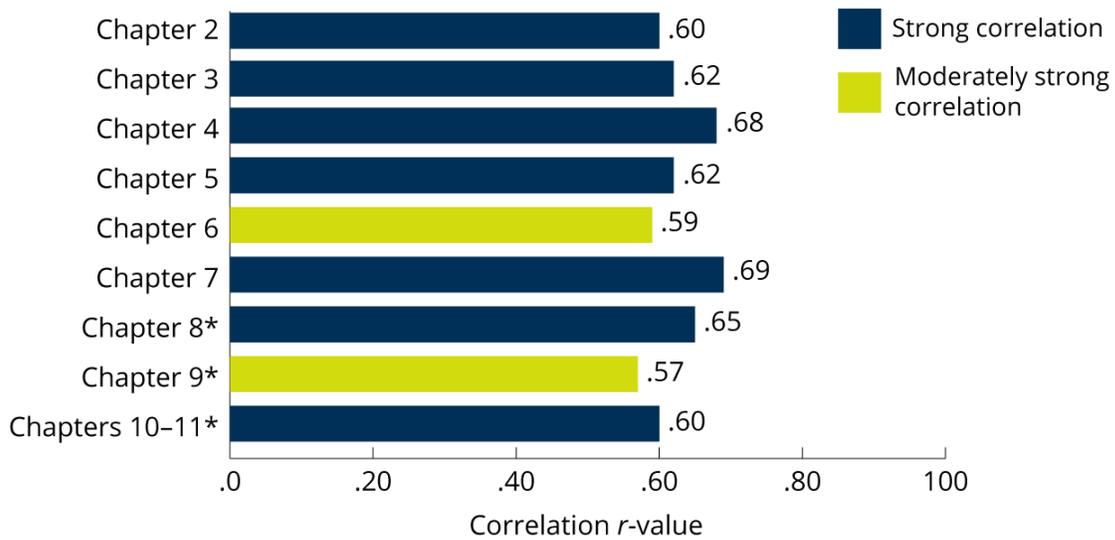


Figure 1. Correlation between Chapter Quiz and Chapter Test Performance, by Chapter, for Spring 2017, $p < 0.001$. (Chapter 2: $n = 294$; Chapter 3: $n = 285$; Chapter 4: $n = 239$; Chapter 5: $n = 234$; Chapter 6: $n = 218$; Chapter 7: $n = 213$; Chapter 8: $n = 158$; Chapter 9: $n = 156$; Chapter 10: $n = 151$) *Content from Chapters 8-11 was assessed on a single test. Each correlation illustrated represents the correlation between performance on that test and performance on the individual chapter quiz.

Student performance on chapter tests was also analyzed. The data show that, on average, approximately 9 percent of students did not take tests. For those students who did attempt chapter tests, 82 percent passed them. Figure 2 shows the percentage of students who passed or failed tests based on the number of students attempting tests.

Chapter test performance

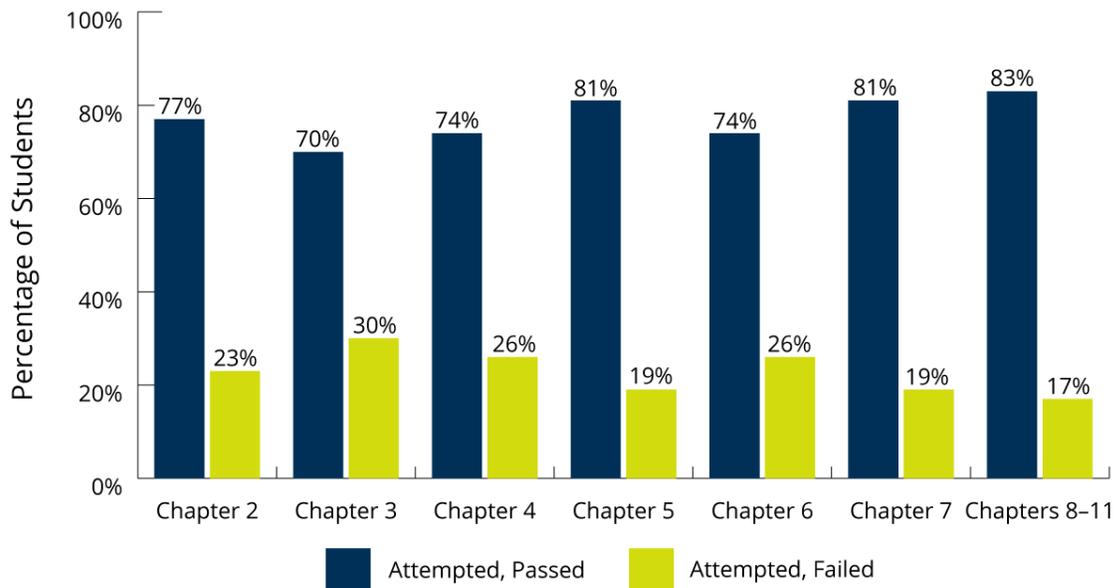


Figure 2. Chapter Test Performance for Students Attempting Chapter Tests in Spring 2017 (Chapter 2: $n = 227$; Chapter 3: $n = 223$; Chapter 4: $n = 227$; Chapter 5: $n = 222$; Chapter 6: $n = 208$; Chapter 7: $n = 202$; Chapter 8-11: $n = 160$)

The Student Experience

Students in DTCC's Elementary Algebra course were asked to complete a voluntary, end-of-semester survey (7 percent response rate) to share their perspectives on MyLab Math and instructor intervention and motivation strategies.

When asked, "How has MyLab Math impacted your learning in this course?" student comments included:

- *"It gave me the tools I need outside of the classroom."*
- *"[MyLab Math] allowed me to access my homework and study anywhere, anytime."*
- *"I truly enjoyed the fact that I had plenty of opportunities for practice."*

Student responses to the question, "How has MyLab Math benefited your learning in this course?" included:

- *"I was able to focus on areas where I made mistakes."*
- *"[MyLab Math] helped to fill in on areas I wasn't sure of with the 'View an Example' and 'Help Me Solve This' features."*
- *"It allowed me to see where I make mistakes so I can work harder on those areas."*

Finally, when asked, "How did your instructor's correspondence with you affect your motivation in this course?" students responded:

- *"She motivated me to do better."*
- *"I wanted to give up in the beginning of the semester, and she encouraged me to continue. After this class, I have overcome my fear and have a new outlook on math."*

Conclusion

The department chairs and faculty at DTCC realized that, while the emporium format works at some institutions, it wasn't working at their school. They set out to create a new course structure that used a textbook more closely aligned with their teaching style, added deadlines to keep their students on track to completion, took advantage of newer features in MyLab, and started actively using two MyLab dashboards. The dashboard and the optional predictive analysis now allow faculty to engage with their students more closely and lead them to greater success. Quiz-to-test correlations and chapter test success rates show that students are responding well to these changes. Kim Gregor says, "We know that instructor engagement matters. When you can see the instructors who are engaging with students through the dashboard and the connection that makes to the student results, you can move from anecdotal evidence to black-and-white proof. We can see who is and who isn't putting in the effort." Adds Vezmar, "Evidence that we can give to our administration, showing everything we did to save a student, helps tell our story."