

MyLab educator study examines student success in Transitional Algebra at Southcentral Kentucky Community and Technical College

Key Findings

- Assistant Professor Claudean Ellis shares how their newest emporium course, Transitional Algebra, has been designed to address exactly the skills students need based on their program of study.
- After the course was redesigned, the number of students successfully completing their developmental math requirement in a single semester increased 51 percentage points. Passing grades increased 16 percentage points and Making Progress grades decreased 15 percentage points.
- Students improved their diagnostic pre-test to post-test scores an average of 47 percentage points.

Study Specifics

School: Southcentral Kentucky Community and Technical College, Bowling Green, KY

Course name: Transitional Algebra

Course format: Emporium

Timeframe: Fall 2016–Spring 2017

Educator: Claudean Ellis

Results reported by: Julie Rebert, Pearson Results Manager

Course materials: MyLab Math in MyLabsPlus for *Prealgebra & Introductory Algebra* by Martin-Gay; *Beginning & Intermediate Algebra* by Martin-Gay; *Geometry* by Martin-Gay; *Emporium Transitional Algebra Workbook: Preparing Students for Success in College Mathematics* by the SKYCTC math faculty

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.

- **Enrollment:** approximately 5,000 credit students (Fall 2016)
- Minority students: 16%
- Financial aid students: 97%

About the Course

Transitional Algebra is a three-credit, modular course containing six tracks that correspond to the pre-requirements and co-requirements unique to the following college-level courses. Modules are as follows:

- Module 1: Whole Numbers
- Module 2: Fractions
- Module 3: Decimals
- Module 4: Real Numbers
- Module 5: Solving Equations
- Module 6: Solving Inequalities
- Module 7: Exponents
- Module 8: Polynomials
- Module 9: Factoring Polynomials
- Module 10: Roots, Rational Exponents
- Module 11: Graphing
- Module 12: Geometry

The six associated tracks with their required diagnostics and modules are:

College-level Math Course Track	Diagnostics and Content Covered in MyLab
Business Mathematics	Diagnostic 1: Modules 1, 3, 4 Diagnostic 2: Modules 5, 7, 10, 11
Applied Mathematics	Diagnostic 1: Modules 1–4 Diagnostic 2: Modules 5–7, 11
Technical Mathematics	Diagnostic 1: Modules 1–4 Diagnostic 2: Modules 5, 11, 12
Technical Algebra and Trigonometry	Diagnostic 1: Modules 1–4 Diagnostic 2: Modules 5, 7–12
Contemporary College Algebra	Diagnostic 1: Modules 1–3 Diagnostic 2: Modules 5, 7, 9
College Algebra	Diagnostic 1: Modules 1–4 Diagnostic 2: Modules 5–9 Diagnostic 3: Modules 10–12

Students enroll in Transitional Algebra based on their KCTCS Placement Exam results, with their track identified based on their program of study. Calculator use is optional and only scientific calculators may be used. Graphing calculators, cell phones, and other apps are prohibited.

Challenges and Goals

An [educator case study](#) completed in January 2017 reflected on the transition of SKYCTC’s developmental math courses from a lecture-based to an emporium format. The goal at the time was to create a course structure that gave students the flexibility to progress more quickly through the developmental content, while maintaining student success. While results were favorable, the SKYCTC math faculty felt they could do even more to help their students. In this study, Assistant Professor Claudean Ellis shares how their newest emporium course, Transitional Algebra, has been designed to address exactly the skills students need based on their program of study. By focusing on success in each college-level course as a primary goal, Ellis was able to streamline the number of objectives that students need to master, thereby eliminating unnecessary content and further reducing the time spent at the developmental level. She hoped her efforts would allow students to pass through their developmental math requirement successfully and quickly.

Implementation

All modules for the Transitional Algebra tracks are delivered through MyLabsPlus™ using MyLab™ Math in an emporium format and the course is embedded in [Blackboard](#), SKYCTC’s learning management system. Learning materials for lessons in each course include a multimedia textbook, an interactive lesson presentation, audio lectures, and other resources in MyLab. Homework may be completed at home, but module diagnostic pre-tests and post-tests are proctored.

Ellis uses a MyLab [coordinator course](#) to ensure consistency among the various tracks, modules, and sections of the course. Instructors provide a course outline, pacing guide, and list of pre-requirements and

co-requirements for students. Pre-requirements represent those objectives that must be mastered before a student is released from Transitional Algebra to take their college-level math course. Co-requirements are objectives that may be retaken while enrolled in the college-level course if they are not mastered in Transitional Algebra. Students needing additional time to master co-requirements sign up for a supplemental course, taken alongside their college-level math course, specifically targeting those objectives.

“This course helps to keep you from going through multiple math classes to get to the course you need for the degree you are wanting.”

—Student, Southcentral Kentucky Community and Technical College

Diagnostic pre-tests

Students must complete either two or three diagnostic pre-tests covering content from a group of modules required for their track of study. The College Algebra track contains three diagnostic tests. All other tracks provide two diagnostic tests. Only one attempt is allowed and the results determine whether a student must remediate within the modules or may move on to the next diagnostic. If a student passes a pre-test with 80% or higher, they will continue to the next pre-test. If a student does not achieve the required 80% minimum score, they will complete the homework from each module and finally a diagnostic post-test. No notes or materials are allowed while taking a pre-test.

Module homework

Module homework is [personalized](#) based on a student's diagnostic pre-test results. Each question in this MyLab homework can be worked until the correct answer is found, with no restriction on time or number of attempts. Homework assignments utilize [learning aids](#) to assist students as they work independently. In an anonymous, voluntary survey, students reported that the three most helpful learning aids were View an Example, Ask My Instructor, and Help Me Solve This. One student shared, “[MyLab] breaks down the problem in an easy step-by-step process and makes it very do-able.” Ellis recommends that students complete each problem to make a 95% or 100% on the homework assignment in order to ensure that they fully understand the objectives prior to taking the diagnostic post-test. Homework assignments may be completed outside of class and students are encouraged to keep a neatly organized math notebook to write down examples and information from the eText for reference as they continue through their modules.

Additional resources

In addition to the MyLab access code and eText, students are also required to purchase the *Emporium Transitional Algebra Workbook: Preparing Students for Success in College Mathematics*, created by the SKYCTC math faculty to provide extra guidance for students completing course modules. The workbook is aligned with the modules and provides examples, definitions, and helpful hints.

Each student is also encouraged to access the [MyLab Study Plan](#) for extra practice on homework exercises. The Study Plan is customized for each student based on questions missed on homework and previous diagnostics. Work done in the Study Plan does not count towards a student's final grade, but its value as an additional source of low stakes review prior to taking a diagnostic post-test is emphasized. Free tutoring is also available at the campus Learning Center.

Diagnostic post-tests

Once students have completed the homework from their MyLab modules and any additional independent review in the Study Plan, they take the diagnostic post-test. Students must earn 80% or higher on the post-test to move forward in their curriculum, but have unlimited attempts to do so. A scientific calculator and formula sheet is allowed, however the math notebook and the *Emporium Transitional Algebra Workbook* may not be used.

Assessments

Grades of Passing (P), Making Progress (MP), Failing (F), or Withdraw (W) are assigned for Transitional Algebra, based on a student's success on diagnostic tests within each course. Students earning at least 80% on each diagnostic required for their track earn a passing grade (P) for the Transitional Algebra course. Each test includes content from multiple modules.

For students not earning passing grades on each required diagnostic, a grade of MP or MP-96 is assigned. Students not completing all pre-requirements are assigned a grade of MP, indicating that they are making progress towards completion, but have more work to finish. Students earning this grade need to retake Transitional Algebra, but work on previously completed modules will carry over to their next semester. The MP-96 grade is reserved for Applied Mathematics, Contemporary College Algebra, and College Algebra students who complete all pre-requirements, but do not pass the co-requirements for their tracks. Students in this position may take their college-level course in the next semester, but must also take the one or two credit MAT 96 (Supplemental Mathematics) course at the same time.

Students who stop attending the course, but do not file the necessary paperwork to process a withdrawal, are assigned a grade of F.

Results and Data

In Fall 2015, the developmental math sequence contained three courses: MAT55 (Pre-Algebra), MAT65 (Basic Algebra), and MAT85 (Intermediate Algebra). Students enrolled in the appropriate course, based on their score on the KCTCS Placement Exam and then needed to complete all remaining courses in the sequence before taking a college-level math course. After redesigning in Fall 2016 to the Transitional Algebra course with multiple tracks, the data show that 72% of students earned grades of P and completed their developmental required coursework in one semester, as compared to just 21% of students in Fall 2015 (figure 1).

Comparison of single-semester completion

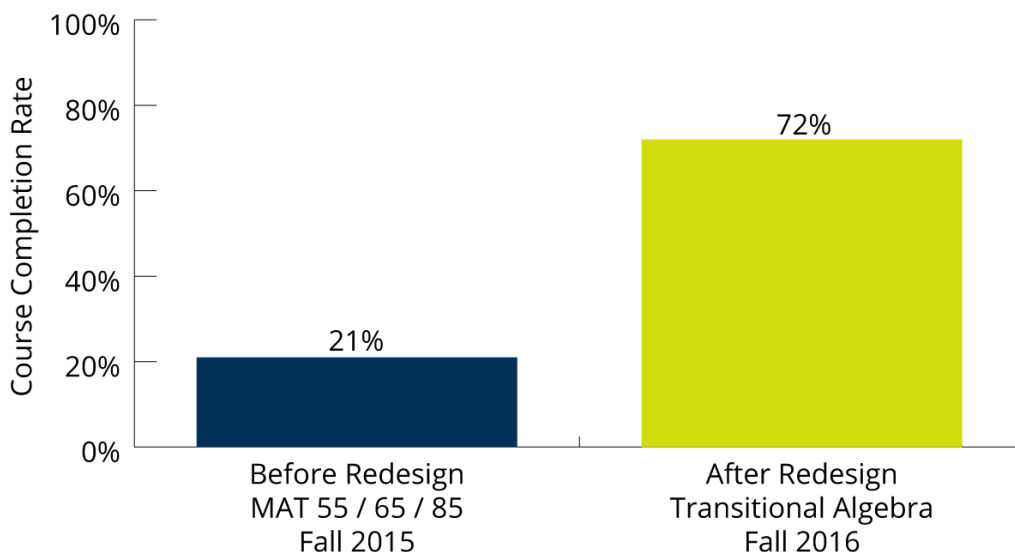


Figure 1. Percentage of Students Completing the Entire Developmental Requirement in a Single Semester Before and After Redesign, MAT55/65/85, Fall 2015, ($n=307$) and Transitional Algebra, Fall 2016 ($n=373$)

Passing (P) and Making Progress (MP) grades were also analyzed both before and after redesign in the Fall semesters. The data in figure 2 show that, prior to redesign, 56% of students earned passing grades, while 34% of enrolled students were awarded making progress grades for their efforts. A year later, in the Transitional Algebra course, the percentage of students passing jumped by 16 percentage points, with the MP grades dropping by 15 percentage points.

Comparison of passing grades and making progress grades

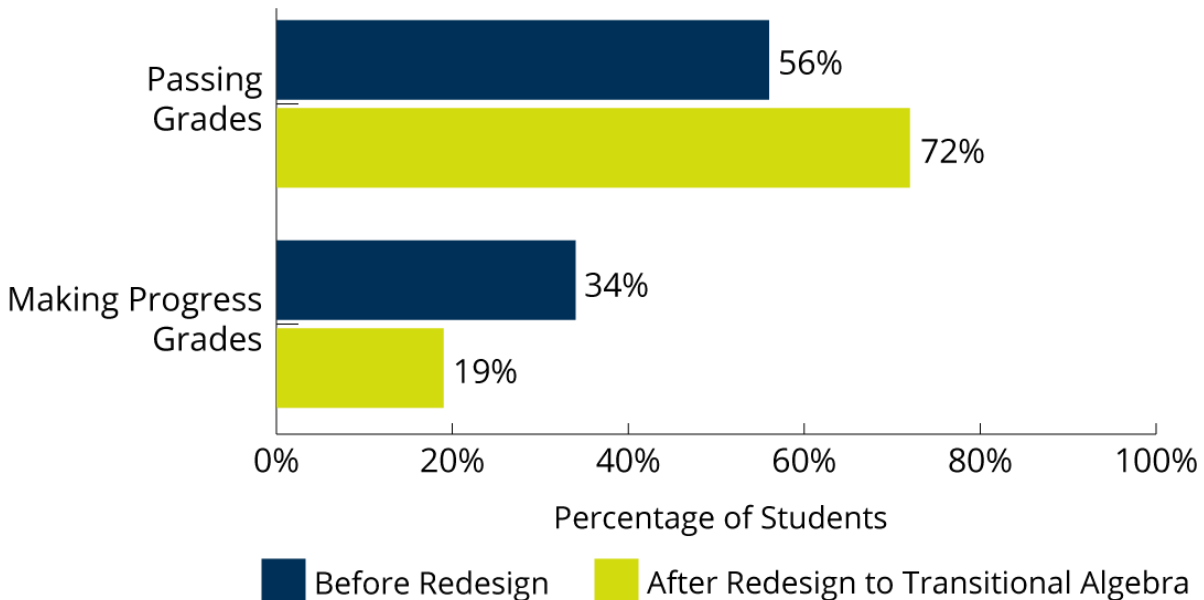


Figure 2. Percentage of Passing Grades and Making Progress Grades Before Redesign, Fall 2015 ($n=307$) and After Redesign, Fall 2016, ($n=373$)

Finally, the diagnostic test data in Transitional Math were explored. Average scores on the diagnostic pre-tests and post-tests, as required by the different tracks, were analyzed to determine overall improvement. Note that data was available only for the upper five tracks in Fall 2016. The results, displayed in figure 3, show statistically significant increases for each track.

- Applied Mathematics Track: Diagnostic Pre-test ($M=42\%$, $SD=15\%$, $N=27$), Diagnostic Post-test ($M=83\%$, $SD=3\%$, $N=27$), $t(26)=-13.82$, $p<0.05$.
- Technical Mathematics Track: Diagnostic Pre-test ($M=44\%$, $SD=19\%$, $N=10$), Diagnostic Post-test ($M=88\%$, $SD=5\%$, $N=10$), $t(9)=-7.87$, $p<0.05$.
- Technical Algebra and Trigonometry Track: Diagnostic Pre-test ($M=42\%$, $SD=19\%$, $N=16$), Diagnostic Post-test ($M=80\%$, $SD=9\%$, $N=16$), $t(15)=-6.90$, $p<0.05$.
- Contemporary College Algebra Track: Diagnostic Pre-test ($M=36\%$, $SD=15\%$, $N=22$), Diagnostic Post-test ($M=83\%$, $SD=6\%$, $N=22$), $t(21)=-12.85$, $p<0.05$.
- College Algebra Track: Diagnostic Pre-test ($M=35\%$, $SD=18\%$, $N=443$), Diagnostic Post-test ($M=82\%$, $SD=10\%$, $N=443$), $t(442)=-53.29$, $p<0.05$.

Average scores on diagnostic pre-tests and post-tests for each Transitional Algebra track

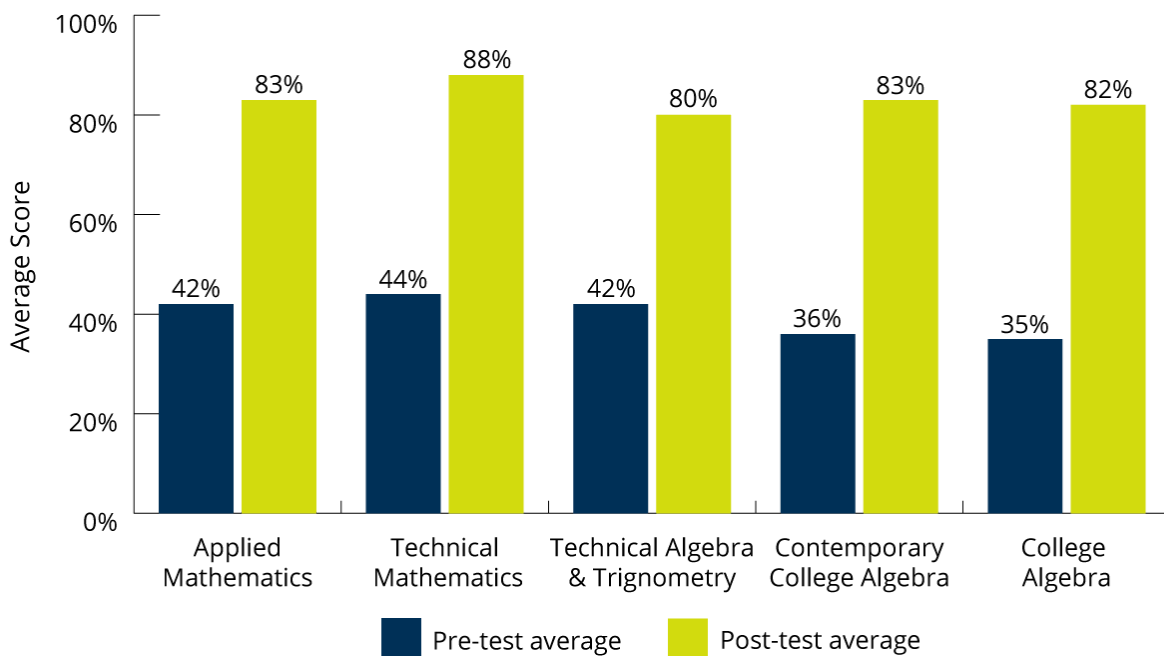


Figure 3. Fall 2016 Average Scores on Diagnostic Pre-tests and Post-tests in Transitional Algebra Tracks: Applied Mathematics ($n=27$), Technical Mathematics ($n=10$), Technical Algebra and Trigonometry ($n=16$), Contemporary College Algebra ($n=22$), and College Algebra ($n=443$)

The Student Experience

“I have always struggled in math, but this course was very helpful and worked well for me. I’m now confident going into my college-level course.”

—Student, Southcentral Kentucky Community and Technical College

In an anonymous, voluntary survey (8% response rate), students commented on the helpfulness of MyLab in their course:

How helpful was MyLab Math in the following areas?	Percent responding helpful or very helpful
Providing adequate practice to understand the concepts	93%
Preparing me for success in my future courses	85%
Providing a positive learning experience	83%
Motivating me to learn	69%
Making me more confident in my ability to understand the concepts	69%

Students also shared their views on how MyLab Math impacted their learning:

- *"I have always struggled in math, but this course was very helpful and worked well for me. I'm now confident going into my college-level course."*
- *"For someone who had never had algebra, it was very helpful."*
- *"They give you example questions and take you step by step on how to do a math problem."*
- *"Being able to work at whatever time is convenient for each individual."*
- *"You are able to work the problems over and over until you get them right."*

Conclusion

In an effort to continue to improve students' time-to-completion and success in their developmental math courses, SKYCTC realized that the modular approach of their initial redesign was a move in the right direction, but that more refinement was needed. Restructuring their sequence into a single course with tracks aligned to a student's college-level math course allowed them to deliver on exactly the objectives necessary for future success, while continuing to offer the course in an emporium format provided the opportunity to serve a wide range of students in one class meeting. The data show more students successfully moving on to college-level math after a single semester. Pre-test to post-test scores also suggest that the personalized homework, with supplemental workbook and study plan work, are providing students with the instruction they need to meet the necessary diagnostic objectives for their modules.