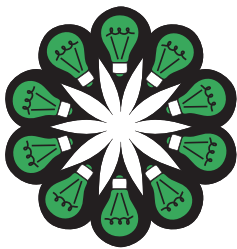


Studies on Long-Term Success: 10+ Years of Sustained Positive Learning Outcomes



A successful implementation never truly ends. It is an ongoing process, ever evolving with the emergence of new and improved technology, the entry of each unique cohort of students, and the increased amount of information gleaned via the long-term tracking and measuring of student data.¹

Schools that choose to address their challenges by redesigning their courses with online learning support, such as MyMathlab, do so with the goal of long-term, sustainable change. Pearson examined some of its most sustainable implementations and discovered that the most critical elements to ensuring the long-term success of a redesign are a willingness to take risks and a commitment to continually reassess results and make changes accordingly.

It is this willingness to try—and fail—that enables an institution to discover the optimum configuration of practices that work best for its faculty and its students. This is why, in concert with the pedagogical characteristics described below, the University of Alabama’s mathematics department is still experiencing learning gains 15 years after first implementing MyMathLab; Louisiana State University’s gains are going strong 10 years later; and Quinisigmond’s results continue to grow after 14 years.

Read on to learn how these and other MyMathLab early adopters are achieving their goals *and* sustaining them over a very, very long time.

University of Alabama

REQUIRED USE AND MANDATORY ATTENDANCE

Improved pass rates throughout the math program were a primary goal at early-adopter, University of Alabama. Not surprisingly, implementation of MyMathLab in an Emporium model in summer 2000 resulted in a rise in redesigned pass rates—from 40 to 50 percent. Administration was inspired, but not finished.

By 2007, the department had heeded students’ requests for the redesign format in higher-level courses. “Students learn math by doing math,” says Joe Bensen, then senior associate dean at the school’s College of Arts and Sciences. Required assignments in MyMathLab and mandatory lab and class attendance enabled more students to do more math.

Although already using the majority of features offered in MyMathLab, including customization, homework, quizzes, tests, and prerequisites, in 2009 the school employed even more of its tools, including item analysis and pooling. “We learned that it takes time,” says Benson. “Administrations need to realize that redesign is unique to each institution. And you have to be patient. Our progress has continued; our numbers go up more every semester.”

As studies have become more longitudinal—data currently spans 13 academic years and covers four courses and seven sections—the school has realized how MyMathLab works best: as part of a larger redesign that includes required use and mandatory attendance. Data consistently show a direct correlation between required attendance in the labs and higher success rates.

¹16 Proven Ways to Help Your Course Redesign Succeed, www.pearsonmylabandmastering.com/northamerica/results/files/Math_courseredesign_WP_Mar2013-24.pdf.

	Fall 00	Fall 01	Fall 02	Fall 03	Fall 04	Fall 05	Fall 06	Fall 07	Fall 08	Fall 09	Fall 10	Fall 11	Fall 12	Fall 13
Beg Algebra			54.6%	56.5%	60.6%	64.2%	73.6%	74.0%	67.8%	67.2%	64.0%	66.7%	84.6%	63.8%
Inter Algebra	50.2%	60.5%	62.9%	78.7%	76.2%	67.2%	73.8%	75.2%	78.1%	70.5%	72.2%	65.3%	65.2%	67.8%
Finite Math			67.0%	66.5%	70.0%	66.0%	70.27%	74.8%	65.5%	77.7%	73.3%	72.7%	80.1%	73.5%
Precalc Algebra			60.5%	70.3%	71.8%	71.6%	66.0%	69.2%	67.1%	72.1%	67.7%	70.4%	73.2%	72.2%
Trigonometry			68.2%	55.1%	65.1%	65.1%	45.15%	66.8%	61.2%	61.2%	67.9%	73.4%	70.3%	60.3%
Precal Alg/Trig			78.5%	80.0%	79.7%	79.7%	80.6%	73.2%	83.7%	87.8%	85.5%	82.6%	83.6%	77.8%
Business Calc				50.7%	64.7%	64.7%	60.4%	61.9%	68.6%	68.2%	67.6%	66.4%	64.7%	56.3%

Table 1. Success Rates of MyMathLab Implementaton by Semester, Fall 2005–Fall 2013

	Sp 01	Sp 02	Sp 03	Sp 04	Sp 05	Sp 06	Sp 07	Sp 08	Sp 09	Sp 10	Sp 11*	Sp 12	Sp 13
Beg Algebra			35.8%	37.2%	49.7%	65.5%	53.2%	54.6%	60.9%	49.8%	–	47.8%	71.7%
Inter Algebra	35.8%	49.8%	38.9%	61.8%	59.1%	56.2%	59.8%	57.3%	66.6%	59.0%	–	55.0%	46.2%
Finite Math			63.5%	56.2%	65.0%	56.3%	62.0%	65.2%	63.6%	73.0%	–	68.7%	76.0%
Precalc Algebra			66.6%	68.5%	65.0%	62.6%	57.2%	62.8%	65.9%	60.5%	–	71.7%	66.3%
Trigonometry			59.7%	66.8%	66.1%	75.2%	69.0%	72.6%	73.0%	64.5%	–	71.7%	78.7%
Precal Alg/Trig			62.2%	61.4%	80.7%	54.2%	71.4%	57.1%	75.0%	79.4%	–	67.2%	72.0%
Business Calc				57.4%	64.9%	60.6%	69.8%	72.8%	70.8%	70.8%	–	67.1%	64.1%

Table 1. Success Rates of MyMathLab Implementaton by Semester, Fall 2005–Fall 2013

* N/A due to tornado

Average Intermediate Algebra success rates are an impressive 70 percent in the fall semesters and 58 percent in the spring semesters (tables 1 and 2). Today, faculty continues to hone the redesign and explore what best supports students—and what doesn't.

When asked about a recent decrease in fall Intermediate Algebra pass rates, Jamie Glass, lab coordinator, shared the results of some of the school's recent experiments. "I attribute the decrease to adjusting the curriculum in that course plus changing books plus being mandated to change Beginning Algebra quite a bit. We learned that the adjustment didn't prepare students for Intermediate Math as well as it could, so we are tweaking it to attain continuity between the two courses again. There is always room to try and make things better, which we constantly try to do, and sometimes what we do does not work."

"Administrations need to realize that redesign is unique to each institution. And you have to be patient. Our progress has continued; our numbers go up more every semester."

—Joe Benson
University of Alabama

Quinsigamond Community College

CONSISTENT GRADING AND DELIVERY OF OBJECTIVES

Quinsigamond Community College caters to a very diverse population, including adult, learning disabled, part-time, nonnative English speaking, and evening students. As such, more than 80 percent of its incoming students test into at least one level of developmental math. A rising number of developmental math students was resulting in more developmental math sections, more part-time faculty, and inconsistent delivery of objectives and grading.

In 2001, in an effort to create a measurable way to ensure all students received the same high-quality preparation to progress to and succeed in college-level math, the college redesigned its developmental math program using MyMathLab. By spring 2006, pass rates

“Now that we have many, many years of data, as a department we are able to pilot many different approaches and can assess their effectiveness.”

—*Andreana Grimaldo*
Quinsigamond Community College

in all three developmental math courses—basic math, beginning algebra, and intermediate algebra—had significantly increased with beginning algebra showing a nearly 42 percent average increase from the program pilot.

Although faculty was delighted with the progress made, they continued to look for what gaps still remained. They found that a lack of standardization across nearly 70 faculty and adjunct instructors meant neither content nor grading was consistent.

For its next steps, the college emphasized standardization across the developmental math programs. MyMathLab master courses were employed to enable all levels of instructors to deliver complete, predesigned courses focused on approved objectives. These predesigned courses can be copied and adjusted for each of the college’s learning environments: computer classrooms, noncomputer classrooms, evening classes, fast-paced courses, online courses, and off-campus remote sites.

Today, all students in a course study the same curriculum, at the same pace, at the same level of difficulty; and they take a mandatory, cumulative, departmental final exam on which they must score at least a 73 percent to progress to the next course. “This requirement keeps both faculty and students working towards the same goal and enables tracking of meaningful, comparable data,” says Andreana Grimaldo, professor of mathematics.

Both faculty and adjuncts appreciate the standardization. “Everyone knows exactly what they need to do—no guesswork,” says Grimaldo. “Standardizing the courses has opened a space for sharing and discussion and enabled us to learn from each other.”

This kind of peer collaboration and support helps keep all of the school’s faculty and adjunct instructors on target and communicating. In turn, students are achieving at higher levels and instructors are thriving in an atmosphere of professionalism and collaboration. “This couldn’t happen if everyone wasn’t on the same page,” says Grimaldo.

“Since completion of the redesign in 2006, our measureable data has continued to grow,” says Grimaldo. “Now that we have many, many years of data, as a department we are able to pilot many different approaches and can assess their effectiveness.”

Louisiana State University

INITIAL BUY-IN AND MOTIVATING STUDENTS VIA MEANINGFUL LAB PARTICIPATION GRADES

In spring 2005, Louisiana State University ran a 200-student redesign pilot for College Algebra with a lab component. As a way to motivate students to complete the required lab hours, the redesign team led by Phoebe Rouse, precalculus mathematics director, offered bonus points to students who completed two lab hours each week. By the end of the semester it was clear: the students who participated in lab didn’t need the bonus points; those who needed them weren’t coming.

Rouse and the redesign team reassessed the format and considered creating a participation grade. “To test it, we went back over the student data and calculated a participation grade for each student based on our records of class and lab participation,” says Rouse. “We assigned a grade of 0 percent for nonparticipation or 100 percent for participation for each class and lab week throughout the semester, and then we averaged those grades to arrive at a semester participation grade. We then set a cut-off of 70 percent and grouped the students into those who earned at least 70 percent for participation and those who didn’t. We discovered that even though the actual success rate for the course

was less than 50 percent in the pilot, of those who earned a participation grade of 70 percent or greater, the success rate was approximately 85 percent.” In this way, Rouse and the team concluded that the redesign model of one class a week and required lab hours worked; it was the participation weight that needed adjusting.

Armed with this new information, the team created a participation grade for the next semester valued at 5 percent of the final grade. Data indicated an improvement but clearly there was still room for more.

The next semester, they adjusted again. They raised the criteria to three hours of lab a week, valued lab participation at 5 percent of the final grade, and valued class participation at an additional 5 percent of the final grade. “Combined, lab and class participation are now worth a full letter grade—that got their attention,” says Rouse. “Those who initially weren’t doing their work now did. It needs to matter. For students, that means having the potential to significantly impact their final grade.” Today, fall success rates in the course average about 75 percent.

Rouse describes receiving push-back from students seeking to negotiate the new format. “Students who completed 2.7 hours a week wanted 90 percent of the credit, but participation grades each week are either all or nothing” she says. “Holding the line is sometimes the hardest part of the process!”

Most semesters have 14 lab weeks and 15 class weeks. Because the impact of lab and class participation builds over time, good work habits are consistently reinforced as the semester passes and course content gets more difficult. “We feel confident that we’ve finally arrived at a structure that supports the students, and our outcomes reflect it,” says Rouse.

“[P]articipation grades each week are either all or nothing. Holding the line is sometimes the hardest part of the process.”

—Phoebe Rouse
Louisiana State University

University of Central Florida

MEASURED CHANGE TO PROMOTE IMPROVED LEARNING, RESPOND TO CHANGES IN CURRICULUM, AND FURTHER FACULTY BUY-IN

The University of Central Florida (UCF) adopted MyMathLab in 2005 for its College Algebra course. “Prior to redesign, students were passively listening instead of being actively engaged,” said Tammy Muhs, mathematics coordinator. “And the course suffered from course drift due to a lack of coordinated content among instructors.” Muhs took a slow and measured approach to her redesign and it has paid off—the course pass rate is now significantly higher than the preredesign rate.

Immediately upon implementation, Muhs initiated common homework and quiz assignments. The course success rate rose and she slowly worked additional best practices into the implementation over time. “I caution schools about making too many changes at once,” says Muhs. “If problems arise, it’s too difficult to identify the cause. Changes should be controlled and assessable.”

In fall 2006, Muhs introduced weekly due dates and in-class quizzes. After another noticeable increase in the pass rate she incorporated National Center for Academic Transformation principles, including one-on-one assistance for students and online testing. Success rates skyrocketed and in that spring, using a grant from NCAT, she redesigned the now successful course in the modified emporium model using MyLabsPlus. The following years saw such course additions as homework mastery and required lab time.

“We are constantly checking to see if the implementation is as good as it could be, and we’re not be afraid to make changes to get there.”

—Tammy Muhs
University of Central Florida

“We never stop thinking about our courses and about our redesign. It ensures that the evolution of our implementation is just that: an evolution, and not a revolution.”

*—Tammy Muhs
University of Central Florida*

Throughout the redesign’s evolution, Muhs ensured that the changes she initiated were well thought out, tracked, and assessed. “We don’t make changes simply for the sake of change—changes are made to promote improved learning, as a response to changes in our curriculum, and sometimes to further faculty buy-in. And they’re always measurable.”

Muhs shares how making an experimental change to support faculty buy-in also resulted in data-proven evidence. “As part of our modified Emporium model, students are required to spend at least three hours a week in our lab,” she says. “If the minimum time requirement is met, the student receives a grade of 100 percent for the weekly participation grade; if not, the student earns a grade of 0 percent for that week’s participation grade. During testing week, instead of completing lab hours, students complete a three-part content review. Students must score at least 75 percent on each of three content sections in order to fulfill the lab requirement for testing week. If one of more of the scores is below 75 percent, the student earns a 0 percent for that participation grade.” At a faculty meeting in 2011, a suggestion was made that the mastery set-up was too harsh and that the requirement be downgraded, thereby allowing students to determine their minimum score and using an average of the three review assignments as their lab grade for the week (versus 0 or 100 percent).

In order to reinforce faculty buy-in, Muhs allowed the change for one semester under the condition that the outcomes were analyzed and the results reported to the department.

While some faculty were surprised by the results, Muhs was not. When students were required to achieve at least 75 percent mastery on each of the three review sections, the overall average for the review assignments was in the low 80s. When the requirement shifted to an average of their scores, the overall review average dropped to the mid 60s and test scores suffered. The correlation was indisputable.

“Students don’t always set the bar high enough for themselves,” says Muhs. “The three-part review assignment covered the learning objectives on the test. Students who were satisfied with their average, and went no further, were unprepared for the test. Faculty was unanimous—we returned to the original requirement the very next semester.”

Thanks to consistent student preparedness, coordination across the program, and rigorous tracking of data, Muhs is able to immediately compare results both over time and from within the program.

For example, during academic year 2012/13 one section of College Algebra had a strong progress monitoring (PM) component; the other sections did not. “At the end of the semester, the section with the strong progress monitoring component had a higher percentage of students earning a C or higher when compared with the other sections,” says Muhs. “This could imply that the best practice of PM is important.”

Changes like those mentioned above enable Muhs to make data-driven decisions, and provide solid answers for chairs, beginning faculty who don’t yet understand the underpinnings of the course, and students who push back. She is committed to constantly looking ahead. “We never stop thinking about our courses and about our redesign,” she says. “It ensures that the evolution of our implementation is just that: an evolution, and not a revolution.”

Mississippi State University

GETTING THE MOST OUT OF LAB TIME

Prior to fall 2005, the average withdrawal rate for Mississippi State University's College Algebra course was 15 percent; the average success (ABC) rate was 61 percent. They knew their students could do better, and they decided to make a change.

By redesigning the course from a traditional format that included three hours of lecture and optional homework to a hybrid course in which students spend two hours in lecture and two hours in lab per week using MyMathLab, the school significantly improved its College Algebra outcomes. Today, the MyMathLab-supported course's average success rate is 75.8 percent—an increase of 14.8 percentage points; and its average withdrawal rate decreased from 15 percent before redesign to 3.7 percent after.

But it wasn't always a smooth ride to success. "We've done a variety of different things to get our students here," says Kim Walters, mathematics instructor, "based on the knowledge that if they spend more time doing math, they'll be more successful." With the redesign as her foundation, Walters experimented with different ways to format and value lab time.

"Initially, we were lax on the lab aspect—it was required, but students needed to individually sign up for time to take quizzes and tests. Not only was this ineffectual, it was a scheduling nightmare." Walters then shifted the format so that students signed up for a preestablished lab time at registration. Although this streamlined the process, because use of the lab was optional, students only attended it for testing. "Because they weren't in the lab on a regular basis, they forgot about it."

In fall 2012, Walters required students to attend lab for 50 minutes a week—and required that they work on math while there. To support the initiative, she made a homework score of at least 70 percent a prerequisite for quizzes. Students complained and initially faculty backed down. By fall 2013, however, comparison data made it clear that the prerequisite made a difference. Walters again required it and faculty stood firm. "Today we have very few students with a low homework average," she says. "In fact, most students do more than the required 70 percent."

While the number of factors involved in evolving an implementation mean it isn't possible to conclude a direct cause and effect relationship, the student learning outcomes are indisputable. A comparison of data from fall 2012 to spring 2014, since requiring lab attendance, to data from prior the requirement shows an increase in the average success rate and a decrease in the average percentage of Ds, Fs, and withdrawals.

What's more, because students are now doing the homework, data obtained from MyMathLab's item analysis can be extrapolated for further growth. "At both the end of the semester and the end of every year, when we assess objectives we now have a more realistic version of what works and what doesn't," says Walters. "It's part of the whole process—being able to evaluate our implementation and learn from it. Don't ever be afraid to try something or go back to something. What works or doesn't work in one moment may change down the road."

"Don't ever be afraid to try something or go back to something. What works or doesn't work in one moment may change down the road."

—Kim Walters
Mississippi State University

University of Idaho

ESTABLISHING EFFECTIVE PREREQUISITE THRESHOLDS AND STAGGERED DUE DATES

Like most early adopters of MyMathLab, Kirk Trigsted, mathematics instructor and director of the school's Polya Mathematics Learning Center at the University of Idaho, took a measured approach to his implementation. "We started in 2001," he says. "It wasn't until our second and third years that we started experimenting with the program, its features, and our format." Today, Trigsted is not only a power user of the program, he's also the author of Pearson's Trigsted MyMathLab eCourses, which include a new form of eTexts that are written from the ground up within MyMathLab and include a seamless mix of text, videos, interactive animations, tutorials, and assessment. His students use this new program for weekly homework, weekly quizzes, and exams, and attend 2.5 hours of required lab time each week.

"One thing I've definitely learned to do is to document. It's exceedingly helpful to have ongoing diary of your changes over time—I wish I'd started sooner."

—Kirk Trigsted
University of Idaho

The school's Intermediate and College Algebra programs are undeniably solid and serve as examples to other institutions. Trigsted credits this success to constant experimentation and a willingness to continually push faculty's expectations of what both the program and their students can accomplish. "Of course missteps occurred along the way," he said. "That's how we learned what does work."

Trigsted was eager to share examples of how seeming missteps helped evolve the school's implementation into the success it is today. "The first year that we used MyMathLab, we only used it for homework," he says. The next year, they added MyMathLab quizzes. In 2004, it was a natural next step to make homework completion a prerequisite to opening the quiz; they set the threshold at 75 percent. "It wasn't a very successful semester," says Trigsted. "We were disappointed to see that the overall homework average was only about 77 percent. We didn't expect students to just stop once the requirement was met." With that information in mind, over the next two semesters Trigsted increased the percentage to 90 percent. "Sure enough," he says, "now the overall average is about 90 percent. It showed us in no uncertain terms that the majority of students will rise only to the expectation that we present—averages consistently occurred about 2 percentage points higher than the threshold. The better students earn 100 percent, but the mediocre and poor students simply stop."

Another valuable learning came regarding homework due dates. "In the Emporium model, we meet in class one day a week, and homework deadlines are set according to the class day," says Trigsted. By staggering due dates, Trigsted accommodates all the students in the school's limited lab space. Initially, he made the due date the night of class so students could attempt the assignment during the week and then use class time to address any questions. "No one had questions," he says. "Students do everything at the last minute." Overnight, Trigsted changed the deadline to the night before class and assigned a quiz the night of class. It's now a vastly more effective flow: instructors perform an item analysis on the homework before class, and address common issues and prepare students for the quiz during class.

"Over the course of an implementation, tons of little tweaking happens," says Trigsted. "One thing I've definitely learned to do is to document. It's exceedingly helpful to have ongoing diary of your changes over time—I wish I'd started sooner."

Cleveland State Community College

SLOWLY EVOLVING INTERVENTION, MASTERY LEVELS, AND REQUIRED LAB TIME

Originally, Karen Wyrick, chair of the mathematics department, was skeptical of redesign. “I wasn’t sure it would speak to our caliber of students,” she says. But then she saw that her students both prefer it to the traditional format and achieve more with it, and her attitude did a complete 180. Today she’s one of redesign’s biggest fans.

“Changes are an inherent part of redesign—we change something every semester,” says Wyrick. “We ask how we can make it better via more or less lab time, tutoring time, mastering levels, and so on. We’re continually trying to help our students succeed.”

In spring 2008, the implementation’s onset, students were offered unlimited attempts to take tests. “Our thinking was that they’d ask us to help them with what they didn’t understand,” says Wyrick. “But they didn’t ask.” So in fall 2009, Wyrick reassessed and both limited test attempts to 10 and required completion of an individualized homework set based on the results of the student’s first test attempt. After completion of the homework set, students could attempt the test nine more times without intervention. By 2013, it was clear that even more intervention was needed, and a second individualized homework set was assigned after a fifth attempt.

“We tweak, assess, and tweak some more,” says Wyrick. “We used a similar process to establish course mastery levels and required lab time.”

Initially, mastery levels were set at 70 percent for everything: homework, quizzes, tests, and participation. “We soon found that by raising the mastery percentage, students achieved more,” says Wyrick. “We adjusted them to 90 percent on homework, 80 percent on quizzes, and 75 percent on tests—and found that rather than being intimidated, the students consistently reach the bars we set.”

In most college algebra and statistics courses, the last two weeks of the semester are a flurry of students trying to finish assignments at the last minute. With this in mind, Wyrick initially required one hour of lab time per week, plus an additional hour of work elsewhere. But some students did only the one hour of lab time—and no more. “Because we couldn’t track time spent outside the lab, students didn’t do it,” she says. “So in fall 2013, we increased the lab requirement to two hours and dropped the outside hour. As a result, student success went up—the increased practice helped students to stay on track.”

Wyrick plans to improve the program again for summer 2014. “If a student successfully passes the homework assignments for the week, we will waive the lab requirement,” she says. “We believe it will especially be a boon for nontraditional and working students.”

“Nothing stays the same,” says Wyrick. “Cohorts change, state requirements change... a successful redesign demands a constant level of assessment and reassessment in the moment, and the commitment to shift and adjust as needed.”

Cleveland State implemented their redesign in fall 2008 and then in 2012 the State of Tennessee initiated a statewide redesign of developmental math—from course structure to curriculum to testing placements. “Because of all the changes, it can be hard to directly compare data,” says Wyrick. “What I do know is that our success rate was 46 percent when we started, then rose to 68 percent, and is now around 64 percent. Although the rate has slightly dropped, we are now asking more of our students—I still believe that every change we’ve made ultimately has been for the better.”

“We tweak, assess, and tweak some more.”

*—Karen Wyrick
Cleveland State Community College*