



MAKING THE GRADE, V.3

A Compendium of Data-Driven Case Studies on the Effectiveness of MyMathLab and MathXL

BY MICHELLE D. SPECKLER • SUMMER 2008

Table of Contents

From the Editor	1	Various Formats	26
Case Studies	2	<i>Central Texas College</i>	
Lab Based	2	<i>DeVry University</i>	
<i>Lone Star College–Montgomery</i>		<i>Quinsigamond Community College</i>	
<i>Louisiana State University–Baton Rouge</i>		Efficacy Studies	30
<i>University of Alabama</i>		<i>Florida Community College at Jacksonville</i>	
<i>University of Idaho</i>		<i>Houston Community College</i>	
<i>University of Wisconsin–Stout</i>		What Students Are Saying	32
Hybrid	12	What Instructors Are Saying	35
<i>Boise State University</i>		Conclusion	36
<i>College of the Sequoias</i>		Glossary of Terms Used in This Report	38
<i>Florence-Darlington Technical College</i>		List of Contributors	41
<i>Yavapai College</i>			
Traditional	19		
<i>Chicago State University</i>			
<i>Hillsborough Community College</i>			
<i>Mesa Community College</i>			
<i>Memorial University of Newfoundland</i>			
<i>Odessa College</i>			
<i>University of Illinois at Chicago</i>			

Michelle Speckler is founder of Speckler Creative, an independent marketing/communications firm in Livingston, Montana. Drawing from nearly two decades of professional editorial experience in high technology and its convergence with higher academia, Speckler Creative provides a broad range of strategic communication services for national and international corporations, nonprofit organizations, and educational institutions. Present clients include Pearson Education, Inc., the Internet Society, and National LambdaRail. Previous clients include the Corporation for Education Network Initiatives in California, the National Center for Academic Transformation, Educom, and the National Learning Infrastructure Initiative. For more information, contact Michelle Speckler at speckler@bigsky.net.

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By Michelle D. Speckler
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Pearson Education, 75 Arlington Street, Suite 300, Boston, MA 02116

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From the Editor

[Mathematics] serves as the gate keeper to participation in the decision-making processes of society. To deny some access to participation in mathematics is then also to determine, a priori, who will move ahead and who will stay behind.

— J.D. Vomink, *Mathematics By All*, (1994)

Welcome to Making the Grade, Version 3.0. In years past, we presented a broad view of the challenges and opportunities of higher education mathematics. We described the crises of high costs, low pass rates, and large enrollments. We told how organizations like the National Center for Academic Transformation are successfully supporting the use of technology-rich educational environments and delivery systems to reduce the gap between cost reduction and quality of service. And we introduced MyMathLab and MathXL as proven-effective tools for solving those problems and moving ahead.

In Version 3 we take you—those using MyMathLab and MathXL, as well as those just now considering integrating technology into their classrooms—into the field to hear directly from those behind the data: How do the most successful programs in North America increase retention rates, improve pass rates, and effect subsequent success? To that end, we not only report the data; we also show how that data was achieved by tracking and analyzing student results over time. We tell how institutions around the United States and Canada are accessing a new model of teaching and learning and achieving higher-than-ever student gains.

Such evolution requires a critical shift of focus away from technology itself and toward achievement. “Some may feel that the use of technology is pandering to today’s millennial students’ need to feel entertained,” says Sandee House of Georgia Perimeter College. “The truth is that the technology train has left the station, and it’s our job as responsible educators to determine the best technology available and the most appropriate way to use it while also making adjustments in our way of thinking about the role of the teacher in the classroom.”

The institutions spotlighted in our report have all made

“adjustments in [their] way of thinking.” They’ve assessed the greater structures and systems of the teaching and learning process and have embraced departmentally, if not institutionally, a common set of core values as follows:

- Required use of MyMathLab and MathXL, thus creating a correlation between the integration of information technology into the curriculum and increased student gains
- Greater student engagement with content and one another, supported by information technology
- Sound pedagogy as leader, so that technology is recognized as an enabler for good practice rather than as the focus
- A collective, long-term commitment by faculty to participating as a team

Only by reshaping the teaching and learning model in these ways can institutions and instructors take full advantage of the networked environment and ensure both lasting improvement in student learning and lifelong success. We believe it can happen. We believe this report can help.

The case studies in this report consist of a collection of data gathered from instructors willing to share the results they have observed. In every case, MyMathLab or MathXL was both the vehicle that delivered the content and the tool that measured the results via the program’s built-in Gradebook. In addition, in every case, the program was paired with a physical, title-specific textbook that was, by design, correlated with the program. For rigorously controlled efficacy studies, see Efficacy Studies. For a description of terms as used in the context of this report, see Glossary of Terms.

We look forward to your feedback—and to including in next year’s report a description of your own institution’s success.

Lone Star College–Montgomery

Course Names Pre-Algebra, Introductory Algebra, Intermediate Algebra, College Algebra

Credit Hours Three

Semesters Covered Fall 2004–Spring 2007

Types of Data Reported Success Rates, Subsequent Success, Retention



Textbooks in Use with MyMathLab

Basic Mathematics, 10e, 2007, Bittinger; *Introductory Algebra*, 10e, 2007, Bittinger; *Intermediate Algebra*:

Concepts and Applications, 7e, 2006, Bittinger, Ellenbogen; *College Algebra*, 9e, 2005, Lial, Hornsby, Schneider

MyMathLab Course Structure

Course Design

Faculty at the Learning Outcome Assessment Lab (LOAL) at Lone Star College–Montgomery use MyMathLab and a flexible schedule to help students better retain course material by testing outcomes individually throughout the course versus at the end of the semester.

Students participate in class lectures and weekly review sessions and follow a weekly syllabus—all under the supervision and appropriate intervention of chair and faculty who stay current on student progress via weekly grade updates and weekly news and procedure updates.

Assessments

The LOAL uses MyMathLab to deliver assessments based on desired course outcomes. Lab hours range from early morning to late at night Monday through Thursday, with morning and afternoon hours on Friday and Saturday. Students may take the assessments at any time the lab is open, may make as many as seven attempts at any one assessment, and are required to pass all outcomes lab assessments in order to pass the course. LOAL assessments count for 20 percent of the final grade. Students do not pass the course without at least 60 percent on each outcome and a minimum 70 percent overall average.

MyMathLab's Gradebook enables instructors to track student participation and progress and to intervene if necessary via tutoring or other support services.

Courses typically require 8 to 10 concept-based assessments. Regular assessment empowers students to take charge of their learning. By continually evaluating their strengths and weaknesses via the immediate feedback provided by MyMathLab, students know exactly where they need further study and are less likely to fall behind early in the semester, when it is hardest to rebound.

MyMathLab Implementation

Students utilize MyMathLab for testing and homework, which contributes 20 to 30 percent of their final course grade. The LOAL's emphasis on continual assessment and early intervention directly benefits from MyMathLab's core qualities of proactivity, time efficiency, flexibility, immediate feedback, security, and student accountability. The commitment of all faculty members to training in the software and in workshops on pedagogy further ensures program success.

Some instructors import grades into MyMathLab from other sources.

MyMathLab Course Results

Tables 1 through 5 show more-than-statistically-significant differences in retention, pass rates, and subsequent success between students who have completed the MyMathLab outcomes assessment program and those who have not.

In spring 2006 alone, retention rates among those students employing the LOAL/MyMathLab program in Introductory Algebra, Intermediate Algebra, or College Algebra were all above 90 percent. In the case of College Algebra, the 98 percent retention rate reflects a 75 percent gain

	Without MyMathLab	With MyMathLab	Percent Increase
Introductory Algebra	65%	97%	49%
Intermediate Algebra	71%	92%	30%
College Algebra	56%	98%	75%

Table 1. Retention Rates, Spring 2006*

*Data reflect unduplicated student enrollment.

The way MyMathLab has enabled us to integrate outcomes assessments into our courses and then standardize them across the department—it's revolutionized our whole program.

—Maureen Loiacano
Lone Star College—Montgomery

over the 56 percent retention rate among those students who didn't employ LOAL and MyMathLab. See Table 1.

Pass rates from fall 2004 to spring 2007 comparing students who had completed the MyMathLab regular outcomes assessment program in the previous course and students who had not show the unequivocal benefit of regular outcomes assessment and early intervention. Col-

	Without MyMathLab in Pre-Algebra	With MyMathLab in Pre-Algebra	Percent Increase
Spring 2005	45%	54%	20%
Fall 2005	57%	59%	4%
Spring 2006	54%	59%	9%
Fall 2006	54%	62%	15%

Table 2. Subsequent Success: Pass Rates in Introductory Algebra, Spring 2005–Fall 2006*

*Data reflect unduplicated student enrollment.

	Without MyMathLab in Intro Algebra	With MyMathLab in Intro Algebra	Percent Increase
Spring 2005	36%	46%	28%
Fall 2005	50%	55%	10%
Spring 2006	50%	60%	20%
Fall 2006	51%	65%	27%

Table 3. Subsequent Success: Pass Rates in Intermediate Algebra, Spring 2005–Fall 2006*

*Data reflect unduplicated student enrollment.

lege Algebra, the first college-level class students typically take after completing the developmental math sequence, saw the most significant pass rate difference: an average of 79 percent for those who had worked in the MyMathLab-powered Learning Outcome Assessment Lab in their previous course work versus an average of 64.5 percent for those who had not. Tables 2 to 4 detail subsequent success comparisons from spring 2005 to fall 2006 for Introductory Algebra, Intermediate Algebra, and College Algebra.

Course enrollments are also increasing across all levels. Table 5 shows percent enrollment increases—most marked in Calculus, where spring enrollment increased by 30 percent.

	Without MyMathLab in Inter Algebra	With MyMathLab in Inter Algebra	Percent Increase
Spring 2005	55%	73%	33%
Fall 2005	76%	84%	11%
Spring 2006	72%	80%	11%
Fall 2006	55%	79%	44%

Table 4. Subsequent Success: Pass Rates in College Algebra, Spring 2005–Fall 2006*

*Data reflect unduplicated student enrollment.

	Spring 2005 to Spring 2006	Fall 2005 to Fall 2006
Developmental	4%	5%
College Level	13%	11%
Calculus	30%	10%

Table 5. Percent Increase in Course Enrollments

Conclusions

The faculty at Lone Star College—Montgomery continue to build upon the winning combination of MyMathLab and continual outcomes assessment in a mandated mathematics lab. By employing the following set of proven components, faculty find consistent, replicable success.

- Faculty and students with joint ownership of the math curriculum
- A technology-based outcomes assessment program with superior training and communication

- Understanding that outcomes achievement or not finishing lessons defines course completion
- Giving students the tools to assess their own progress, which leads to improved success rates
- Supportive faculty who are willing to offer their time, energy, and ideas

Submitted by Maureen Loiacano, Chair, Mathematics and Education
Lone Star College—Montgomery

Louisiana State University–Baton Rouge

Course Name College Algebra

Credit Hours Three

Semesters Covered Spring 2001–Fall 2007

Types of Data Reported Participation, Retention, Success Rates



Textbook in Use with MyMathLab

Algebra and Trigonometry, 8e, 2008, Sullivan

MyMathLab Course Structure

Course Design

The Roadmap to Redesign model requires active participation and increased use of technology from students. Students are required to spend one hour a week in a traditional classroom of 40 students and a minimum of three flexible hours a week in a math lab using MyMathLab.

The 275-seat Pleasant Hall Math Learning Lab is open 60 hours each week and is staffed with instructors, teaching assistants, and undergraduate math majors. In addition to putting in the minimum required hours in the learning lab, students can work additional hours in the lab or work at their convenience from a Web-accessible computer.

Assessments

All assessments are taken using MyMathLab. The final grade is determined as follows:

- 10 percent Participation (*5 percent for class participation and 5 percent for lab hours*)
- 10 percent Homework (*2 of 29 homework scores will be dropped*)
- 10 percent Quizzes (*2 of 9 quiz scores will be dropped*)

40 percent Tests (*4 tests, lowest may be replaced with final exam score*)

30 percent Final Exam (*departmental, group, cumulative*)

MyMathLab Implementation

MyMathLab homework, quizzes, and tests contribute to 90 percent of each student's final course grade. All assignments are created in MyMathLab by the course coordinators, thus ensuring quality control of content and avoiding course drift. Exercises generated by MyMathLab are iterations of the textbook exercises. Homework may be repeated an unlimited number of times prior to the due date. Quiz and test questions come directly from the assigned homework problems. Quizzes may be attempted up to 10 times before the due date; quizzes are drawn from a pool of questions with similar objectives. Test questions are also pooled. Tests are proctored, password protected, and taken in the university testing center during a six-day period. Students are allowed one attempt at tests. Due dates are entered by each teacher to accommodate section meeting days and so as not to overload the lab.

Grades are exported to an in-house course management system.

MyMathLab Course Results

Data for fall 2006 illustrates the positive correlation between time spent on task and final grade. During the semester charted below, 90 percent of students who

completed 70 to 100 percent of the minimum participation requirements (going to class and working in the lab) earned a grade of A, B, or C. See Table 1.

Percentage of Class- and Lab-Time Participation	Number of Students Earning Grade of A, B, or C	Number of Students Earning Grade of D, F, or W	Total	Percentage of As, Bs, and Cs in Category
70–100	1,143	122	1,265	90
0–69	187	287	474	39
Total	1,330	409	1,739	76

Table 1. Participation Data for College Algebra, Fall 2006

This student-centered approach to learning requires students to put in more time doing mathematics and less time watching mathematics, which is why their learning outcomes are measurably higher.

—Phoebe Rouse
Louisiana State University–Baton Rouge

Student success increases when students do more math. Under the LSU redesigned format, students not only do more math but also receive help from a variety of resources—MyMathLab tutorials (help, examples, videos), teachers, tutors in the learning lab, and locally produced

videos—which address all learning styles. There is no end to the available resources for students who want to learn. Table 2 shows the chronology of LSU’s College Algebra redesign efforts from spring 2001 through fall 2007 and the positive results those efforts have achieved.

	Course Description	Number of Students	Percent Drop Rate	Final Exam Median	Percent ABC Rates	Percent ABC Rates per Calendar Year
Spring 2001	Traditional Sections	1,223	31	68	50	
Fall 2001	Traditional Sections	3,115	16	73	66	63
Spring 2002	Traditional Sections	1,191	22	69	54	
Fall 2002	Traditional Sections	3,188	15	70	64	61
Spring 2003	Traditional Sections	1,066	21	68	53	
Fall 2003	Traditional Sections	3,211	14	72	68	67
Spring 2004	Traditional Sections	1,025	18	68	64	
Fall 2004	Large Lecture Sections with MyMathLab	742	20	80	66	69
Fall 2004	Traditional Sections	2,605	14	76	72	
Spring 2005	Traditional Sections	610	17	71	66	
Spring 2005	Redesigned Sections with MyMathLab (pilot)	196	34	61	47	
Fall 2005*	Large Lecture Sections with MyMathLab	841	20	76	66	55*
Fall 2005*	Traditional Sections	743	28	64	49	
Fall 2005*	Redesigned Sections with MyMathLab	922	29	73	48	
Spring 2006	Redesigned Sections with MyMathLab	567	26	67	59	
Fall 2006	Redesigned Sections with MyMathLab	1,724	6	78	75	72
Spring 2007	Redesigned Sections with MyMathLab	384	11	71	55	
Fall 2007**	Redesigned Sections with MyMathLab	1,739	7	64	67	

*Hurricanes Katrina and Rita greatly affected these statistics, in particular the drop rate. First-semester students with Math ACT of 25 or greater were given automatic course credit for the first time.

**Course rigor increased.

Table 2. Drop Rates, Final Exam Medians, and Success Rates for College Algebra, Spring 2001–Fall 2007

Conclusions

A goal of redesign was to retain the high rate of student success in College Algebra. Using the present, redesigned program (with MyMathLab), LSU–Baton Rouge has improved on previous success rates (with the exception of the Katrina/Rita semester).

An Early Intervention program is being piloted in an effort to identify and immediately engage students who fall behind early in the course.

Submitted by Phoebe Rouse, Precalculus Mathematics Coordinator
Louisiana State University–Baton Rouge

University of Alabama

Course Names Beginning Algebra, Intermediate Algebra, Finite Math, Precalculus Algebra

Credit Hours Three

Semesters Covered Fall 2000–Fall 2007

Types of Data Reported Success Rates, Retention

THE UNIVERSITY OF
ALABAMA

Textbooks in Use with MyMathLab

Beginning Algebra, 10e, 2008, Lial, Hornsby, McGinnis; *Intermediate Algebra*, 3e, 2007, Martin-Gay; *Finite Mathematics*, 8e, 2005, Lial, Greenwell, Ritchey; *Precalculus*, 3e,

2008, Beecher, Penna, Bittinger; *Calculus with Applications*, 9e, 2008, Lial, Greenwell, Ritchey

MyMathLab Course Structure

Course Design

Beginning Algebra and Intermediate Algebra courses have one required meeting per week in which students report to the math lab and work on homework and quizzes. In other courses, weekly meetings consist of lecture on key topics for the week. The math lab is open 71 hours a week; students may receive individualized assistance from a staff of instructors and tutors. Students work at their own pace within the deadlines stated in the syllabus. Some students finish the course within eight weeks of the semester start, but the majority work according to deadlines.

Course format comprises the following:

- 30- to 50-minute classes that introduce students to topics and course objectives
- 3 to 4 hours in the lab or elsewhere working independently and using course software that presents a series of topics covering specific learning objectives
- Instructors and tutors available in the Mathematics Technology Learning Center 71 hours a week to provide individualized assistance

Assessments

Within each section of content there is a homework and quiz requirement that contributes to the course grade. Four major tests (not cumulative) each contribute 10 percent to the course grade. A comprehensive final exam counts as 30 percent of the final course grade. In addition, students have lab and class attendance requirements.

MyMathLab Implementation

The University of Alabama uses the majority of features offered in MyMathLab, including customization, homework, quizzes, tests, and prerequisites—contributing 93 percent of each student's final course grade. UA imports grades into its own grade book.

In summer 2000, UA redesigned the math program using MyMathLab and the Math Emporium model developed by Virginia Polytechnic Institute and State University and the National Center for Academic Transformation's Course Redesign program. UA's College of Arts and Sciences assigned to the course the Mathematics Technology Learning Center, which started out as a 70-seat computer lab and now seats 500.

MyMathLab Course Results

By spring 2006, Intermediate Algebra pass rates had risen an average of 20.2 percent from 2000 rates, with the percentage of As and Bs increasing from 36.7 percent to 58.3 percent. For those courses in which the department had not fully made the switch to redesign, side-by-side data revealed not only that the pass rate in the MyMathLab-redesigned Business Calculus was course significantly higher than the traditional counterpart (64.7 percent versus 51.3 percent) but also that the failure rate decreased and the withdrawal rate dropped by more than half.

Tables 1 through 5 illustrate MyMathLab's wide range of positive impact. They show measurable outcomes in pass rates and retention data for individual classes and the overall mathematics department—by test, by semester, and as these outcomes relate to subsequent success.

In addition, faculty at UA note the following advantages to the technology-assisted redesign: flexibility in scheduling, ability to move at individual pace, instant feedback, availability of individual help, equality of presentation, equality of testing, and elimination of language problems.

	Fall 00	Spring 01	Fall 01	Spring 02	Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06	Fall 06	Spring 07	Fall 07
Beg Algebra	-	-	-	-	54.6%	35.8%	56.5%	37.2%	60.6%	49.7%	64.2%	65.5%	73.6%	53.2%	74.0%
Inter Algebra	50.2%	35.8%	60.5%	49.8%	62.9%	38.9%	78.7%	61.8%	76.2%	59.1%	67.2%	56.2%	73.8%	59.8%	75.2%
Finite Math	-	-	-	-	67.0%	63.5%	66.5%	56.2%	70.0%	65.0%	66.0%	56.3%	70.3%	62.0%	74.8%
Precalc Algebra	-	-	-	-	60.5%	66.6%	70.3%	68.5%	71.8%	65.0%	71.6%	62.6%	66.0%	57.2%	69.2%
Trigonometry	-	-	-	-	68.2%	59.7%	55.1%	66.8%	65.1%	66.1%	65.1%	75.2%	45.1%	69.0%	66.8%
Precal Alg/Trig	-	-	-	-	78.5%	62.2%	80.0%	61.4%	79.7%	80.6%	79.7%	54.2%	80.6%	71.4%	73.2%
Business Calc	-	-	-	-	-	-	50.7%	54.9%	64.7%	74.2%	64.7%	60.6%	60.4%	69.8%	61.9%

Table 1. Success Rates of MyMathLab Implementaton by Semester, Fall 2000–Fall 2007

	Fall 02	Spring 03	Fall 03	Spring 04	Fall 04	Spring 05	Fall 05	Spring 06	Fall 06	Spring 07	Fall 07
Beg Algebra	72.8%	53.3%	75.0%	57.0%	79.7%	76.2%	83.7%	73.6%	88.1%	69.4%	85.3%
Inter Algebra	77.2%	59.3%	85.8%	72.3%	86.4%	77.7%	80.1%	73.4%	86.7%	77.0%	85.9%
Finite Math	74.3%	72.4%	80.8%	71.8%	85.5%	78.8%	80.5%	70.8%	84.2%	75.7%	85.1%
Precalc Algebra	73.7%	81.7%	78.7%	80.8%	84.5%	82.9%	83.7%	80.9%	84.3%	82.0%	85.6%
Trigonometry	79.9%	83.1%	70.3%	80.4%	82.8%	79.5%	77.0%	85.8%	68.9%	81.9%	81.5%
Precal Alg/Trig	91.8%	84.2%	93.9%	88.4%	96.3%	84.4%	91.6%	75.0%	95.5%	85.7%	87.7%
Business Calc	-	-	69.3%	67.6%	64.6%	83.8%	71.3%	76.4%	75.0%	81.7%	77.2%

Table 2. Retention Rates of MyMathLab Implementaton by Semester, Fall 2002–Fall 2007

	Test 1	Test 2	Test 3	Test 4	Final
Fall 2001	92.4%	89.3%	83.8%	81.6%	78.6%
Fall 2002	92.3%	89.7%	84.7%	79.4%	77.2%
Fall 2003	92.1%	91.2%	88.6%	86.3%	85.8%
Fall 2004	94.4%	92.2%	90.0%	86.6%	86.4%
Fall 2005	93.6%	89.7%	82.7%	79.7%	80.1%

Table 3. Intermediate Algebra Retention per Test, Fall 2001–Fall 2005*

*Data reflect the percentage of students enrolled in the course who took each test.

	Test 1	Test 2	Test 3	Test 4	Final
Without MML	88.4%	83.0%	67.0%	64.9%	67.3%
With MML	94.6%	92.2%	85.6%	82.6%	81.4%

Table 5. Business Calculus Retention per Test, Fall 2005*

*Data reflect the percentage of students enrolled in the course who took each test.

	Semesters	Pass Rate for Subsequent Course
Without MML	Fall 1998–Spring 1999	57.4%
	Fall 1999–Spring 2000	54.6%
With MML	Fall 2000–Spring 2001	58.0%
	Fall 2001–Spring 2002	74.6%
	Fall 2002–Spring 2003	81.4%

Table 4. Pass Rates for Subsequent Courses before and after MyMathLab Implementation

Conclusions

The use of MyMathLab has significantly improved student success rates. Prior to implementation MyMathLab, success rates averaged 40 to 45 percent. Today, success rates in Intermediate Algebra have averaged 70 percent in the fall semesters and 60 percent in the spring semesters.

As studies have become more longitudinal, UA has realized how MyMathLab works best: as part of a larger redesign that includes mandated use by students. The results consistently show a direct correlation between required attendance in the labs and higher success rates.

Longitudinal studies have also increased UA's awareness of MyMathLab's impact on subsequent success. By 2006, students who came out of a MyMathLab–redesigned Inter-

mediate Algebra course passed their subsequent course, Precalculus Algebra, at an average rate of 71.3 percent compared with the overall average of 48.3 percent.

Based on this data, the University of Alabama is convinced: MyMathLab in an Emporium redesign setup can enhance student learning; can increase success rates, particularly for underserved students; and can reduce resource demands.

Plans for the future include using even more of the tools offered by MyMathLab (e.g., item analysis and pooling) to further increase student success rates.

Submitted by Jamie Glass
Mathematics Technology Learning Center Lab Coordinator
University of Alabama

University of Idaho

Course Name Intermediate Algebra

Credit Hours Three

Semesters Covered Fall 1997–Fall 2006

Types of Data Reported Success Rates, Final Grade



Textbook in Use with MyMathLab

Intermediate Algebra, 8e, 2006, Lial, Hornsby, Miller

MyMathLab Course Structure

Course Design

Students must attend a focus group each week and spend a minimum of three hours a week in the Polya Math Center, which is available more than 80 hours a week and staffed by trained undergraduates, graduate students, and faculty. All other course work can be done from anywhere because all material, including all content lectures, can be accessed online.

In the one-hour, weekly focus group, students are given study strategies and guided through exactly what to do in order to successfully learn the current material.

During the three-hour weekly lab requirement, students may supplement their learning in any number of ways:

- Attend any one of nine live lectures repeated throughout the week
- Do MyMathLab homework assignments.
During each nontest week there is a homework assignment of 50 to 80 problems.
- Take quizzes using MyMathLab.
During each nontest week there is a 10-problem quiz.
- Watch online lectures
- Request help
- Do practice exercises on MyMathLab

Assessments

- 13 percent Participation
(7 percent for class participation, 6 percent for lab hours)
- 12 percent Homework/quizzes
- 55 percent Tests *(four tests)*
- 20 percent Final exam

MyMathLab Implementation

Students use MyMathLab to complete weekly homework assignments and quizzes, which contribute 12 percent to each student's final course grade. Students must accurately complete at least 75 percent of the weekly homework assignment in order to take the quiz. Students are encouraged to watch specific online lectures and take notes prior to working on the homework assignments. Quizzes may be attempted up to 10 times.

Students are required to spend at least three hours a week in the lab. Lab time is excused for any week in which students earn a least a 95 percent combined score on the homework and quiz. To help them study for exams, students work through optional test objective assignments and practice tests in MyMathLab.

All grades are exported and uploaded into a homegrown database system.

MyMathLab Course Results

At the onset of course redesign, students completed traditional paper-and-pencil textbook homework assignments. In fall 2003, students were offered the choice of completing a traditional homework assignment or one through MyMathLab. Instructors soon realized that students who chose the MyMathLab option were better prepared for exams. In fall 2004, instructors tracked student success

vis-à-vis both of the homework options and concluded that students who completed their homework with MyMathLab were far more successful in the course than students who chose the traditional homework option. See Table 1.

Shortly thereafter, the MyMathLab homework option was changed from optional to required. The ABC rate for Intermediate Algebra students has increased by more than

I think that the students succeed using MyMathLab because they get immediate feedback and they are able to rework the problems as many times as they want. The reinforcement of working a problem over and over is key to success in entry-level mathematics courses.

—Kirk Trigsted
University of Idaho

ABC Rate Using Textbook Homework	ABC Rate Using MyMathLab Homework
64.7%	78%

Table 1. Fall 2004 Developmental Math Pass Rates for Those Students Who Took the Final Exam

Grade	Before Polya/ MyMathLab	After Polya/ MyMathLab
A	15%	21%
B	25%	26%
C	22%	22%
D	13%	12%
F	18%	11%
W	7%	7%

Table 2. Final Grades for Fall Intermediate Algebra, 1997 to 2006

7 percent since the course redesign was implemented. Table 2 illustrates the individual grade comparisons for Intermediate Algebra before and after redesign. Of note is that the number of As increased by 40 percent and the number of Fs decreased by 38.8 percent.

Additional data reveals that of those students who attend focus groups each week, fulfill lab time requirements, attempt all homework and quizzes, and take each test at least three times, more than 96 percent will pass the course.

Conclusions

In the traditional setting, students often do not receive their homework back for a week. By this time, it is usually too late for the students to go back and correct their misconceptions. Most students do not take the time to look at them. Students need immediate feedback in order to learn, and MyMathLab provides it.

The University of Idaho is exploring using MyMathLab in its calculus courses. Other plans include utilizing MyMathLab for testing.

In addition, faculty have noticed the following secondary results of redesign:

- Although hours in the classroom have decreased for teachers, the number of student contact hours has increased.
- Forty to 50 students finish the course early each semester.
- Classroom space requirements have decreased by two-thirds.
- Cost per student has decreased.
- It has been possible to reach out to rural-area schools and promote dual enrollment.

Redesign has also enabled participation and success in math for students in the University of Idaho College Assistance Migrant Program (CAMP), a program that assists students who meet the definition of migrant/seasonal farmworkers or children of migrant/seasonal farmworkers.

In fall 2006, 27 out of the 29 CAMP students earned an A, B, or C in Developmental Math. In spring 2007—the subsequent semester—21 of the 27 students who passed Developmental Math enrolled in Math 143. Twenty of the 21 students passed.

*Submitted by Kirk Trigsted, Director, Polya Math Center
University of Idaho*

University of Wisconsin–Stout

Course Names Beginning Algebra, Intermediate Algebra

Credit Hours Two, Four

Semesters Covered Fall 2004–Spring 2008

Type of Data Reported Retention



Textbooks in Use with MyMathLab

Beginning Algebra, 5e, 2009, Martin-Gay; *Intermediate Algebra*, 4e, 2005, Martin-Gay; *Algebra and Trigonometry*,

3e, 2007, Blitzer

MyMathLab Course Structure

Course Design

Beginning Algebra meets twice a week for a total of two hours; Intermediate Algebra meets four times a week for a total of four hours. MyMathLab homework is scheduled and due each class day. It may be done at any location, but all quizzes and tests are taken in the classroom or lab with a proctor. Students may work ahead.

Assessments

Beginning Algebra

- 5 quizzes, 2 tests in MyMathLab, plus one quiz outside MyMathLab, each with an accompanying practice quiz/test available in MyMathLab
- 21 MyMathLab homework assignments

Intermediate Algebra

- 7 quizzes, 4 tests in MyMathLab, each with an accompanying practice quiz or test available in MyMathLab
- 42 MyMathLab homework assignments
- 5 homework assignments outside of MyMathLab

MyMathLab Implementation

Use of MyMathLab contributes 90 percent to each student's final course grade and includes homework, proctored tests, and quizzes; prerequisites for some homework and tests; the Individual Settings feature; and the Coordinator course feature. Grades are not imported from other sources.

MyMathLab Course Results

The cornerstone of UW-Stout's math program is daily computer-graded homework that counts significantly (about 25 percent) toward the course grade and is continually monitored by the classroom instructor, who actively intervenes as soon as a student shows signs of falling behind. What distinguishes this curriculum from exclusively online courses is the blending of online homework and tests with required daily classroom sessions in a dedicated, technology-enhanced classroom/tutor lab complex. Another key factor is a new tutoring service dedicated exclusively to supporting Beginning Algebra and Intermediate Algebra students.

Since its inception in fall 2004, the Math Teaching and Learning Center (TLC) has served 2,140 students. During this time, the combined failure/withdrawal rate for the 501 students who have taken remedial Beginning Algebra under the new system has decreased by 55 percent (from 29 percent to 13 percent). See Figure 1.

Results in the Intermediate Algebra course show a less dramatic, 39 percent reduction in nonpass rates (17.8 percent for 1,639 students over seven semesters versus 29 percent pre-Math TLC). See Figure 2.

MyMathLab's tracking features reveal that 95 percent of students are submitting all homework assignments, earning for them an average score of 92 percent. Students are spending an average of 95 minutes on each day's homework assignment—a figure for which no previous comparison data exist but which most teachers of these courses anywhere would find astonishing. Attendance rates now average 94 percent for Intermediate Algebra and 85 percent for Beginning Algebra. From 150 to 200 students visit the tutor lab per week compared with the 75 to 80 tutoring sessions per semester logged by the campuswide, free tutoring service for students in these two courses before the program began.

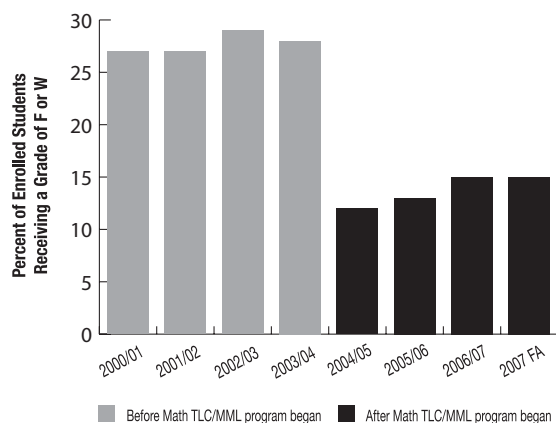


Figure 1. Year-by-year data of the percent of students receiving failure or withdrawal grades in Beginning Algebra

In addition to passing these two courses at unprecedented rates, students are registering greater engagement and satisfaction with the learning experience—despite the greater demands placed on them. On an anonymous and voluntary survey distributed to Math TLC students at the end of each semester, 91 percent of respondents indicated that they learned as much as or more than they expected to learn coming into the course; 84 percent said they'd be likely to take a course using this structure again. And despite the prominence of online homework and learning tools, students still rated *my teacher* as the top factor influencing their learning out of seven choices (online homework, online help, lectures, tutors, my teacher, open lab, textbook)—strong evidence that the personal interaction

Conclusions

When asked about her view of the future of mathematics instruction vis-à-vis her experience with MyMathLab, Jeanne Foley, director of UW-Stout's Math Teaching and Learning Center, replied with the following.

“Technology will become the universal course delivery medium. There will still be a market for so-called brick-and-mortar universities and on-site rather than online classes—despite the accelerating growth of online universities and online course work at traditional institutions. It is especially the students who struggle with math and who are taking remedial or introductory math classes who most need the hands-on support of a live teacher in a real classroom. There is a real synergy between the benefits offered by MyMathLab and the face-to-face interactions between students and their classroom teacher and tutors.

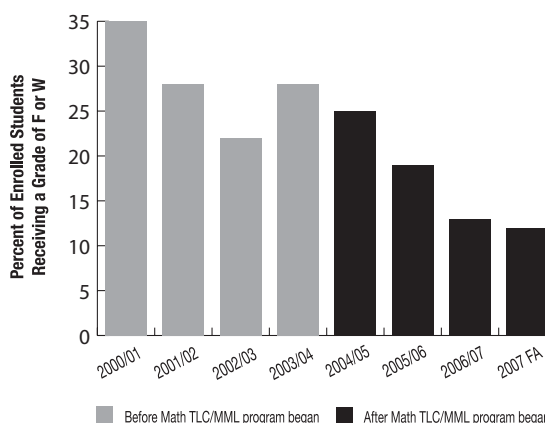


Figure 2. Year-by-year data of the percent of students receiving failure or withdrawal grades in Intermediate Algebra

this program provides in the classroom and lab is an essential feature distinguishing this approach from strictly online and even most hybrid course structures.

Written responses to student survey questions are typified by this verbatim quote: “This class completely changed my views on math. Before this class I hated math and never wanted to do it. I hated math even in grade school! After this course I *love* math and am considering a math minor. I'm even thinking of being a tutor in the Math TLC next year. I would never have imagined *me* teaching and helping others with math.”

“Students' learning habits have changed tremendously in the past 10 years. Although it does seem that students' attention spans for lectures and their ability to focus for extended times on traditional assignments have diminished, their willingness to spend one or two or sometimes even three hours a day on interactive homework like the MyMathLab exercises has increased. Students in UW-Stout Intermediate Algebra classes are spending an average of 95 minutes a day on their MyMathLab homework—far more than they spent when these courses were taught traditionally.”

*Submitted by Jeanne Foley, Director, Math Teaching and Learning Center
University of Wisconsin-Stout*

Boise State University

Course Names Elementary Algebra, Intermediate Algebra

Credit Hours Zero, Four

Semesters Covered Fall 2007–Fall 2008

Types of Data Reported Homework, Quiz, Exam Averages, Success Rates



HYBRID

Textbook in Use with MyMathLab

Beginning and Intermediate Algebra, 4e, 2008, Lial, Hornsby, McGinnis

MyMathLab Course Structure

Course Design

Classes meet with an instructor for one hour per week. Students use MyMathLab for main content delivery, assigned homework, and weekly quizzes, as well as 80 percent of each unit exam. Some instructors also assign paper-and-pencil homework for the one-hour meeting each week. There are two, live campus lecture forums that are optional.

Students have access to the Math Learning Center approximately 80 hours per week. At the Math Learning Center, there are 70 computers and three or four instructors and/or teaching assistants.

Assessments

- 15 percent Weekly homework and quizzes
Completed via MyMathLab
- 60 percent Unit exams
Three in Elementary Algebra, four in Intermediate Algebra. Given during the weekly class meeting in two ways: 20 percent paper and pencil, 80 percent via MyMathLab. Students may retake the MyMathLab portion of a test up to three days after the scheduled exam.

- 20 percent Final exam
Paper-and-pencil exams
- 5 percent Participation and attendance

MyMathLab Implementation

In 2002 Boise State University developed a hybrid-format elementary algebra program in which students received instruction in two ways: one day a week with their instructor and the rest through MyMathLab. All students in all sections did all of their weekly homework assignments via MyMathLab. In 2003 BSU added Intermediate Algebra to its hybrid program. Quiz formats were left up to the individual instructors, and tests were paper and pencil. In fall 2004 BSU added quizzes to those items completed via MyMathLab. In fall 2006 BSU started offering late tests online—for those students who missed their scheduled class test. In fall 2007 BSU began using online testing in every section for all students. Today, use of MyMathLab contributes 63 percent to each student’s final course grade. Grades are not imported into the MyMathLab Gradebook. Test totals and attendance scores are hand posted; the MyMathLab Gradebook is exported into Microsoft Excel in order to track statistics for each course.

MyMathLab Course Results

Course Name	Type of Student	Total Number of Students	Homework Average	Quiz Average	Exam Average	Pass Rate (A, B, or C)
Elementary Algebra	All	657	64%	57%	46%	30%
	Took Final	371	82%	76%	67%	53%
Intermediate Algebra	All	824	70%	62%	56%	39%
	Took Final	434	81%	84%	66%	55%

Table 1. Fall 2007 Results

I enjoyed the ability to work at my own pace, as well as having so much extra information available to me. The many different sources available made me feel like this course was designed for success.

—Student
Boise State University

Course Name	Type of Student	Total Number of Students	Homework Average	Quiz Average	Exam Average	Pass Rate (A, B, or C)
Elementary Algebra	All	514	70%	66%	56%	47%
	Took Final	361	82%	79%	70%	66%
Intermediate Algebra	All	678	70%	65%	57%	41%
	Took Final	505	80%	77%	67%	54%

Table 2. Spring 2007 Results

Course Name	Type of Student	Total Number of Students	Homework Average	Quiz Average	Exam Average	Pass Rate (A, B, or C)
Elementary Algebra	All	576	64%	64%	49%	36%
	Took Final	349	80%	80%	67%	60%
Intermediate Algebra	All	668	70%	70%	53%	39%
	Took Final	434	84%	84%	66%	55%

Table 3. Fall 2008 Results

Conclusions

MyMathLab has been successful in handling the two biggest issues BSU faced in 2002: physical space for classes above the developmental level and curricular control of the Elementary Algebra and Intermediate Algebra classes.

Previous to the redesign of Elementary Algebra and Intermediate Algebra into hybrid formats, those same sections of the courses monopolized 49 classrooms for three or four days a week. BSU now uses one classroom in the Math building and a 3,000-square-foot building housing the 70 computers that compose the Math Learning Center.

In addition, all students now receive the same homework, the same quizzes, and the same tests—no matter what time of day they meet and no matter which instructor they have. This standardization of the curriculum enables BSU to accurately track assessments throughout the department.

BSU drop/withdraw/fail (DWF) rates have remained fairly constant: they are about the same as they were when classes were delivered in the traditional classroom: 45 to 55 percent. However, data indicates that students are persisting with the material longer and take one repeat to pass the course. Withdrawal rates themselves are lower, and drops occur occur much later in the course.

In light of the benefits that BSU has seen during the past five years—including a steady increase in pass rates—BSU plans a substantial next step for fall 2008: required mathematics laboratory attendance. Elementary Algebra courses will have two required lab hours; Intermediate Algebra courses will have three required lab hours.

Submitted by Susan Knights
Former Director of Developmental Mathematics
Boise State University

College of the Sequoias

Course Name Intermediate Algebra

Credit Hours Four

Semester Covered Fall 2007

Types of Data Reported Success Rates, Retention



Textbook in Use with MyMathLab

Elementary and Intermediate Algebra, 2e, 2009, Woodbury

MyMathLab Course Structure

Course Design

This traditional course meets four hours per week. Outside of class, students complete a MyMathLab homework assignment for each section covered in the text. They can work each problem as many times as they like. They take two quizzes via MyMathLab for each chapter. The first quiz covers the first half of the chapter, and the second quiz covers the second half of the chapter. Students get two attempts at each quiz, with only the better score counting. There also are six in-class, paper-and-pencil exams.

The standard grading policy is as follows:

- MyMathLab homework: 8.33 percent (1 per section)
- MyMathLab quizzes: 8.33 percent (2 per chapter)
- Pencil-and-paper exams: 50 percent (1 per chapter)
- Final exam: 33.33 percent

To promote the use of MyMathLab, its direct impact on the final grade is explained. Students who do not do any of the homework or quizzes would need to average at least 84 percent on the exams and the final to earn a C in the course, and they would need to average at least 96 percent to earn a B. An A is impossible without MyMathLab. If they earn perfect MyMathLab scores, they would need at least 64 percent on the exams and the final to earn a C, at least 76 percent to get a B, and at least 88 percent to earn an A.

The Contract. Students who meet the following criteria may complete a final cumulative assignment instead of taking the final exam. In such a situation, students keep the grade they had before the final.

- No more than two absences
Students benefit from being in class and suffer from not being there.

- Perfect scores on all MyMathLab homework
Students can retry problems until correct and remediate themselves through MyMathLab's support features, at the Math Lab, by working with a group of classmates or by asking the professor.
- MyMathLab quiz average of at least 80 percent
Students have two attempts, thereby eliminating the chance for "typos" to hurt a student's grade. It also offers students an opportunity for self-remediation.
- Exam average of at least 70 percent

Developmental math students lack confidence, and many have a fear of the final exam. Such fear motivates many students to come to class daily, to do homework in a timely fashion, and to learn and understand the material being covered. Following is the developmental math grading policy:

- MyMathLab homework: 12.5 percent
- MyMathLab quizzes: 12.5 percent
- Pencil-and-paper exams: 75 percent

Assessments

Students take two quizzes per chapter via MyMathLab. The first quiz covers the first half of the chapter, and the second quiz covers the second half of the chapter. Students are allowed two attempts on each quiz, with the higher score counting. Students take an exam in class at the end of each chapter, and there are six tests during the semester.

MyMathLab Implementation

MyMathLab homework and quizzes are used in the course. For students using the contract, MyMathLab contributes 25 percent to their final course grade; for those not using the contract, MyMathLab contributes 16.7 percent.

Grades are not imported into MyMathLab from other sources; however, class exams are entered as off-line items.

MyMathLab Course Results

Of the 54 students who began the course, 49 completed it—a retention rate of 90.7 percent. More important, 37 of the 49 students passed the course, for a success rate of 68.5 percent. See Table 1 for a comparison of this course with two intermediate algebra courses taught the previous semester (spring 2007), as well as campuswide data for the same course in fall 2007.

	Spring 2007 MML without Contract	Fall 2007 Campuswide	Fall 2007 MML with Contract
Pass	49.4%	48.3%	68.5%
Fail	36.5%	33.8%	22.2%
Drop	14.1%	17.9%	9.3%
Retention	85.9%	82.1%	90.7%

Table 1. Contract and MyMathLab Efficacy in Intermediate Algebra, Spring 2007–Fall 2007

Use of a contract—as described on the previous page, a method to increase student usage of and time on MyMathLab—in one year has proved to be a successful motivational tool with significant results. Success rates for the semester in which the contract was used were 19.1 percent higher than those for semesters in which the contract was not used and were 20.2 percent higher than the campus average for the same period. Similarly, the failure rate was 14.3 percent lower using MyMathLab with a contract

Conclusions

When students do their homework in an effective way, they learn. Immediate feedback helps students learn and understand mathematics. Some students will work hard and learn regardless of the structure of the class, and some students will not. The third group—the students in the middle—can be motivated to do all of the necessary work in order to succeed. MyMathLab quizzes, with or without the use of a student contract, have a strong correlation with test scores.

As outlined above, success and retention rates were significantly higher with the use of a contract than previous semesters' and campuswide results.

Students in three courses this semester will be offered the student contract: two Intermediate Algebra courses and one Elementary Algebra course.

The following criteria have been added to the contract:

than it was when using MyMathLab without a contract, and 11.6 percent lower than the campus average. The retention rate was 4.8 percent higher for the semester in which a contract was used than for the semester without a contract, and 8.6 percent higher than in courses taught campuswide.

Test Average	Spring 2007 MML without Contract	Fall 2007 MML with Contract
A	12%	35%
B	21%	39%
C	36%	12%
D	9%	8%
F	22%	6%

Table 2. Test Score Averages, Spring 2007–Fall 2007

Using MyMathLab with a contract also resulted in a noticeable improvement in test scores. See Table 2.

Spring 2007 MML without Contract	Fall 2007 MML with Contract
80.7%	93.5%

Table 3. Homework Averages, Spring 2007–Fall 2007

And homework scores improved considerably, because the contract motivated students to earn perfect scores on each assignment. See Table 3.

- A minimum test average of 80 is required (up from 70).
- Student Learning Outcome (SLO) Checkpoint Quizzes must be taken using MyMathLab and on which students must average at least 90 percent. Students may take the quizzes as many times as they wish. The goal is to prepare students for the school's campus SLO assessment and provide data concerning SLOs at the college.
- Students must earn a score of at least 75 percent on the campuswide SLO assessment at the end of the semester. This assessment will contain one problem for four of the course's SLOs.
- Students must complete a series of writing assignments, projects, and study skill exercises.

*Submitted by George Woodbury, Mathematics Instructor
College of the Sequoias*

Florence-Darlington Technical College

Course Names Arithmetic, Pre-Algebra, Beginning Algebra, Intermediate Algebra

Credit Hours Three

Semesters Covered Summer 2005–Fall 2007

Types of Data Reported Success Rates, Final Exam Grades



Textbooks in Use with MyMathLab

Developmental Mathematics, 7e, 2008, Bittinger, Beecher;
Intermediate Algebra: Graphs and Models, 3e, 2008, Bittinger,

Ellenbogen, Johnson; *Algebra and Trigonometry: Graphs and Models*, 4e, 2009, Bittinger, Beecher, Ellenbogen, Penna

MyMathLab Course Structure

Course Design

Students follow a schedule of requirements and work on a computer to actively learn mathematics. Students attend three hours per week in the Hub (math lab), attend two hours of lecture per week, and use MyMathLab to watch videos, see samples, work problems, and take tests.

Assessments

Each course includes five or six tests on which students must demonstrate mastery. The prerequisite feature of MyMathLab prevents students from moving ahead to new sections prior to completing mastery. Tests are taken after progressing through required exercises. Students who

demonstrate mastery may move to the next chapter. Students who do not pass must complete the exercises selected by the MyMathLab study plan. The study plan selects exercises in the topics the students lacked mastery of on that test. All assessment takes place within the MyMathLab program.

MyMathLab Implementation

MyMathLab contributes 15 percent to each student's final course grade. It is used for homework, quizzes, proctored tests, study plans, prerequisites, and announcements.

All grades are imported into MyMathLab, with the exception of the final exam grade, which uses a Scantron sheet.

MyMathLab Course Results

MyMathLab is a required component in every Hub math course. Courses defined as Traditional in the tables that follow are those courses in which MyMathLab is optional and not required as part of the final grade. From this point, Florence-Darlington Technical College has established the following four goals against which all progress is measured.

Primary Goal: Increase students' course competencies by at least 5 percent in remedial/prerequisite courses.

Secondary Goal 1: Increase course completion rates in remedial/prerequisite math courses by at least 5 percent.

Secondary Goal 2: Increase course completion rates of students in curriculum math courses, who took prerequisite math course, by at least 5 percent.

Secondary Goal 3: Increase final exam average in each remedial/prerequisite math course by at least 5 percent.

Course	Environment	Number of Students	Pretest Mean	Posttest Mean	Mean Increase	Percent Difference (Hub over Traditional)	Has Goal Been Met?
Arithmetic	Hub	203	40.5	85.8	45.3	3.9%	No
	Traditional	186	37.3	80.9	43.6		
Pre-Algebra	Hub	226	38.6	54.8	16.2	28.6%	Yes
	Traditional	341	38.4	51.0	12.6		
Beg Algebra	Hub	107	36.7	74.1	37.4	25.9%	Yes
	Traditional	417	37.2	66.9	29.7		
Inter Algebra	Hub	91	33.6	66.7	33.1	19.5%	Yes
	Traditional	249	35.7	64.4	27.7		

Table 1. Primary Goal: Combined Test Score Data from Fall 2006, Spring 2007, Summer 2007, and Fall 2007

Course	Environment	Number of Students Who Completed	Number of Students Who Attempted	Completion Rate	Percent Difference (Hub over Traditional)	Has Goal Been Met?
Arithmetic	Hub	175	296	59.1%	9.3%	Yes
	Traditional	509	1,022	49.8%		
Pre-Algebra	Hub	209	280	74.6%	24.3%	Yes
	Traditional	717	1,427	50.3%		
Beg Algebra	Hub	100	229	43.7%	4.1%	No
	Traditional	626	1,580	39.6%		
Inter Algebra	Hub	67	177	37.9%	-5.2%	No
	Traditional	233	541	43.1%		

Table 2. Secondary Goal 1: Combined Retention Data from Summer 2005 to Spring 2007

Course Sequence	Environment	Number of Students Who Completed	Number of Students Who Attempted	Completion Rate	Percent Difference (Hub over Traditional)	Has Goal Been Met?
Inter Algebra from Beg Algebra	Hub	71	124	57.3%	16.4%	Yes
	Traditional	295	722	40.9%		
College Algebra from Inter Algebra	Hub	47	69	68.1%	7.7%	Yes
	Traditional	180	298	60.4%		
Contemp Math from Beg Algebra	Hub	34	42	81.0%	-2.7%	No
	Traditional	226	270	83.7%		
Alg, Geom, Trig 1 from Pre-Algebra	Hub	10	12	83.3%	13.3%	Yes
	Traditional	21	30	70.0%		

Table 3. Secondary Goal 2: Combined Completion Rates in Subsequent Course Data from Summer 2005 to Summer 2006, Summer 2007, and Fall 2007

Course	Environment	Number of Students Taking Exam	Mean Exam Score	Standard Deviation	Percent Difference (Hub over Traditional)	Has Goal Been Met?
Arithmetic	Hub	182	83.0	8.2	11.1%	Yes
	Traditional	801	74.7	13.3		
Pre-Algebra	Hub	260	70.3	10.9	2.6%	No
	Traditional	1,167	68.5	13.4		
Beg Algebra	Hub	189	71.7	11.0	12.7%	Yes
	Traditional	1,133	63.6	15.0		
Inter Algebra	Hub	131	70.2	12.0	6.2%	Yes
	Traditional	648	66.1	13.3		

Table 4. Secondary Goal 3: Combined Final Exam Data from Summer 2005 to Summer 2007

Conclusions

Data from primary goal competency studies indicate that students learn more with MyMathLab when it is required than when it is optional.

Data from secondary goal 1 completion studies suggest that the completion rate in developmental mathematics courses is directly related to the environment. The completion rate for those students in Arithmetic and Pre-Algebra, in which MyMathLab was required, was significantly higher than in courses in which MyMathLab was optional.

Data from secondary goal 2 suggest that the completion rates in subsequent courses is generally higher for those

students whose remedial or prerequisite course required MyMathLab.

Data for secondary goal 3 suggest that students in courses in which MyMathLab is required perform better on the final exam than do students in courses in which MyMathLab is optional.

*Submitted by Susan Haley, Mathematics Instructor
Florence-Darlington Technical College*

Yavapai College

Course Names Fundamentals of Math, Beginning Algebra, Intermediate Algebra, College Algebra

Credit Hours Three

Semesters Covered Fall 2004–Spring 2007

Types of Data Reported Success Rates, Retention



Textbooks in Use with MyMathLab

Basic Mathematics with Early Integers, 1e, 2007, Bittinger, Penna; *Beginning and Intermediate Algebra with Applications and Visualization*, 1e, 2005, Rockswold; *College*

Algebra in Context, with Applications for the Managerial, Life, and Social Sciences, 2e, 2007, Harshbarger, Yocco

MyMathLab Course Structure

Course Design

Courses generally meet twice a week for 75 minutes each as traditional lecture. MyMathLab is required by some but not all. Some instructors use it extensively and count it in the grade; others make it optional. In fall 2004, MyMathLab was used primarily by full-time instructors. Now, most instructors use the program in some way.

Assessments

Assessments are up to the instructor. Three to five exams

plus a common final exam are given during the semester. Weekly MyMathLab homework or quizzes are given.

MyMathLab Implementation

Most instructors use MyMathLab homework and/or quizzes, contributing anywhere from 0 to 50 percent to each student's final course grade. Exams are administered in class or in a proctored testing center. Most instructors import grades from MyMathLab for Blackboard into a Blackboard Gradebook.

MyMathLab Course Results

	Fundamentals of Math	Beginning Algebra	Intermediate Algebra	College Algebra
Fall 04–Spring 05	55.3%	50.6%	58.3%	65.7%
Fall 05–Spring 06	58.3%	55.2%	58.2%	67.7%
Fall 06–Spring 07	60.8%	55.6%	63.8%	61.0%
Fall 07	61.3%	54.3%	63.2%	60.8%

Table 1. Percentage of As, Bs, and Cs after MyMathLab Implementation

Retention rates have improved since fall 2004 implementation of MyMathLab. MyMathLab was initially adopted for Blackboard in Beginning, Intermediate, and College algebras in a small number of courses. Each subsequent semester, more sections used MyMathLab—as an optional study aid, for online homework, or for online quizzes. Table 1 shows an increase in success rates for Beginning

	Retention Rate
Fall 2004	70%
Spring 2005	70%
Fall 2005	72%
Spring 2006	72%
Fall 2006	74%
Spring 2007	76%
Fall 2007	-

Table 2. Retention Rates after MyMathLab Implementation

Algebra and Intermediate Algebra since implementation. A forthcoming common assessment adoption for College Algebra is expected to elicit an increase there as well. Table 2 shows retention rates in developmental math courses and College Algebra. The figures include courses that did not use MyMathLab. (MyMathLab was introduced in fall 2007 in Fundamentals of Math.)

Conclusions

Yavapai College's adoption of MyMathLab was purposefully slow. Instructors allowed the program's success and ease of use to speak for themselves and thereby converted hesitant faculty and students. The more students used MyMathLab, the more future students expected to use the product. Similarly, the more MyMathLab was used, the more pass

rate success and retention rates increased. Today, Yavapai uses MyMathLab in almost every math course.

*Submitted by David Graser
AMATYC Digital Product Coordinator
Yavapai College*

Chicago State University

Course Name Applied Intermediate Algebra
Credit Hours Eight (four each, Levels I and II)
Semesters Covered Spring 2007–Spring 2008
Type of Data Reported Final Exam Score



Textbook in Use with MyMathLab

Developmental Math (paperback edition), 1e, 2007, Martin-Gay

MyMathLab Course Structure

Course Design

Prior to fall 2007, Chicago State University offered a three-semester remedial mathematics sequence: Basic Mathematics, Basic Algebra, and Intermediate Algebra. Approximately 90 percent of all CSU students were placed into a developmental mathematics class. In fall 2006, CSU began offering condensed, 8-week sessions of the developmental math courses. Each section met the same number of minutes as its 16-week counterpart.

In fall 2007, CSU further revamped the developmental mathematics sequence by replacing the sequence format with a single course, Applied Intermediate Algebra; by

replacing three textbooks with one; and by requiring that students complete all homework in MyMathLab.

Assessments

Students have homework as well as chapter and gateway exams. Some instructors give quizzes. Exams are created by a course coordinator and are common to all sections.

MyMathLab Implementation

Use of MyMathLab contributes 25 percent to each student's final course grade. Homework is completed in MyMathLab, and exams are based on MyMathLab assignments. All instructors use the Gradebook to monitor student progress.

MyMathLab Course Results

Final exam results for spring 2007 developmental mathematics courses were typical of the past. Pass rates—scores of at least 70 percent—ranged from 24.8 to 68 percent.

In spring 2008, faculty were thrilled at the high MyMathLab-enabled final exam pass rate of 83.9 percent, particularly since the three-semester sequence was now taught in 16 weeks. The spring 2008 course also had a 49.3 percent overall final exam pass rate (including students who didn't complete the course)—an indication that about half of the students completed the entire remedial sequence in a single

semester. In previous semesters only a very small percentage had completed the sequence in two or three semesters.

	Semester	Final Exam Pass Rate for Students Who Completed the Course
Basic Mathematics	Spring 2007	68.0%
Basic Algebra		62.5%
Intermediate Algebra		24.8%
Applied Intermediate Algebra	Spring 2008	83.9%

Table 1. Comparison of Spring 2007 and Spring 2008 Final Exam Pass Rates

Conclusions

CSU has concluded that the adoption of MyMathLab played a positive role in student success by motivating students to practice and helping them persevere. Students learned that doing the homework prepared them for the exams, and instructors saw right away which students were completing homework assignments and which weren't.

Another remarkable result from the shift to a MyMathLab-

based, single developmental mathematics course was the extremely high success rate in certain types of problems. Consistently 99 to 100 percent of students were able to multiply binomials and evaluate squares of binomials, compared with about 70 percent in the former Basic Algebra.

*Submitted by Paul Musial, Associate Professor of Mathematics
Chicago State University*

Hillsborough Community College

Course Name College Algebra

Credit Hours Three

Semesters Covered Fall 2004–Summer 2007

Type of Data Reported Success Rates



Textbook in Use with MathXL

College Algebra Essentials, 2e, 2007, Blitzer

MathXL Course Structure

Course Design

Students meet in a traditional, on-campus classroom twice a week for 75 minutes each.

Assessments

Students have firm due dates for homework assignments, and all assignments for each section are due prior to the corresponding test date.

Testing is via paper and pencil in an on-campus classroom. The final grade is determined as follows:

60 percent Four tests

20 percent Final exam

17.5 percent Homework

2.5 percent Attendance

MathXL Implementation

All homework is done online in MathXL and contributes 17.5 percent to each student's final course grade. Some students use the Study Plan, but it is not required.

Homework scores and averages are tracked in the MathXL gradebook. Test scores (from paper-and-pencil tests) are input into the gradebook as an off-line item.

MathXL Course Results

	Without MathXL	With MathXL
Average Final Grade	72.5	78.1
Average Test Score	75.3	78.1
Average Homework Score	79.0	84.5
Percentage of All Students Who Earned an A*	22.9%	37.0%
Percentage of All Students Who Earned an A, B, or C*	72.4%	78.3%
Percentage of Students Who Completed the Course**	92.4%	91.8%
Percentage of As for Students Who Completed the Course**	24.8%	40.3%
Percentage of As, Bs, and Cs for Students Who Completed the Course**	78.4%	85.3%

Table 1. Student Data before and after MathXL Implementation

*"All Students" includes every student whose name appeared on the end-of-semester roster, including students who stopped attending class but did not withdraw from the course.

**"Students Who Completed the Course" refers only to those students who attended the class until the end of the semester and took the final exam.

Conclusions

As illustrated in Table 1, the most dramatic change seen at Hillsborough Community College is the increase in the percentage of As received by students using MathXL versus those not using MathXL: an increase of nearly 15 percent. As MathXL is almost exclusively used for homework, the data indicates that those who do more homework retain the information better and achieve better grades than those who do not. The use of MathXL contributed to a nearly six-point increase in homework scores, an approximately three-point increase in test scores, a six-point increase in the pass rate percentage of all students (including those who stopped attending but did not withdraw), and a seven-point increase in the pass rate percentage of those students who completed the course.

Instructor Brooke Quinlan reports that her students are excited to use the program and they say that they think they passed "because of MathXL." She intends to use MathXL "as long as the department chooses a Pearson textbook."

*Submitted by Brooke Quinlan, Mathematics Instructor
Hillsborough Community College*

Mesa Community College

Course Name College Mathematics

Credit Hours Three

Semester Covered Fall 2007

Type of Data Reported Success Rates



Textbook in Use with MathXL

Thinking Mathematically, 4e, 2008, Blitzer

MathXL Course Structure

Course Design

College Mathematics meets in an on-campus classroom two or three times per week. Students are required to complete homework during and outside of class using MathXL.

Assessments

Assessments vary per instructor. Data below was derived from a course that included chapter tests and a final exam administered in class and that represented approximately

60 percent of the grade: 40 percent for the chapter tests and 20 percent for the final exam.

MathXL Implementation

MathXL is used for homework and contributes 20 percent to each student's final course grade.

Grades for this course are not imported into MathXL from other sources.

MathXL Course Results

	A	B	C	D	F	W	Success Rate
Without MathXL	18%	25%	23%	3%	2%	29%	66%
With MathXL	15%	33%	24%	7%	5%	16%	72%

Table 1. Fall 2007 College Mathematics Success Rates with and without MathXL Implementation

Conclusions

Table 1 shows the data for the fall 2007 semester of College Mathematics, the first semester that Mesa Community College required MathXL for homework. The data suggests that requiring MathXL and weighing its use as a significant percentage of the final grade contributes to both increased student success (a grade of A, B, or C) and increased retention.

Note that the success rate among College Mathematics students for whom MathXL was required for homework and contributes significantly toward the final grade is 9.1 percent higher than the completion rate for those students for whom MathXL was not required. In addition, the withdrawal rate decreased from 29 percent to 16 percent—a decrease of 40 percent.

A product of the first comparison of its kind at Mesa Community College, this data points to a clear and positive correlation between required MathXL use and student gain.

Those instructors who implemented MathXL into their course were pleased with the results. They plan to continue using it and to research the increased student gains possible with MathXL in other courses throughout the mathematics department.

*Submitted by Shawn Wood, Mathematics Instructor
Mesa Community College*

Memorial University of Newfoundland

Course Name Precalculus

Credit Hours Three

Semesters Covered Spring 2007–Fall 2007

Type of Data Reported Success Rates



Textbook in Use with MyMathLab

Algebra and Trigonometry, Custom Edition, 3e, 2007, Blitzer

MyMathLab Course Structure

Course Design

Precalculus is open to students with a Math Placement Test (MPT) score of more than 55 percent and is a prerequisite for Calculus for those students scoring less than 80 percent. The course presents fundamental mathematical concepts and the opportunity to improve computation and logic skills.

The mathematics faculty at Memorial University of Newfoundland report an annual average failure rate of about 30 percent for the course. They cite a variety of possible contributing factors, including students' weak algebra and arithmetic skills, poor reasoning ability with formal concepts, preference for rigid algorithmic approaches, failure to check answers or solution processes, negative attitudes, low motivation, low mastery goals, and poor management skills.

Assessments

Students are required to complete 10 weekly MyMathLab quizzes each semester. They are offered the possibility to practice on a weekly basis with a set of practice problems pertaining to the material taught in class and relevant to their weekly quiz. In total, students are responsible for:

- 10 quizzes via MyMathLab
- 10 weekly written assignments
- 3 midterms
- Final exam

MyMathLab Implementation

A portion of the problems used in weekly practice problem sets and in weekly quizzes are from MyMathLab, which contributes 5 percent to each student's final course grade.

Grades are exported into a course spreadsheet.

MyMathLab Course Results

	MPT Average	Precalculus Average	Percentage of A Students
Spring 2006 (without MML)	76%	89%	12.9%
Spring 2007 (with MML)	70.5%	88%	15.4%

Table 1. Comparison of A-Student Results in Spring 2006 and Spring 2007

Table 1 (last column) shows that the proportion of students receiving As increased from 12.9 percent in spring 2006 (taught without MyMathLab) to 15.4 percent in spring 2007 (when MyMathLab was first incorporated into the course). At MUN, an A corresponds to a score greater than 80 percent. Although the table indicates that the average scores of students receiving As were about

	MPT Average	Precalculus Average	Percentage of B Students
Spring 2006 (without MML)	68.7%	68.7%	19.3%
Spring 2007 (with MML)	57.3%	71.4%	26.9%

Table 2. Comparison of B-Student Results in Spring 2006 and Spring 2007

the same in both years, comparison of the average MPT score (taken prior to enrollment) shows that the group using MyMathLab made greater progress than the group not using MyMathLab did.

Table 2 (last column) shows an even more drastic improvement in the proportion of students receiving Bs, which

In a computer-assisted learning environment, the role of the instructor remains central, complex, and delicate.

—From the presentation *Development of New Instructional Media for Introductory Mathematics*, Oana Radu
Memorial University of Newfoundland

corresponds to a score of 65 to 79 percent. In this case, the percentage of students earning a B increased from 19.3 percent in spring 2006 (without MyMathLab) to 26.9 percent in spring 2007 (when MyMathLab was first incorporated). Of particular note is that the students using MyMathLab had lower average MPT scores—more than 10 percentage points less than the previous semester’s

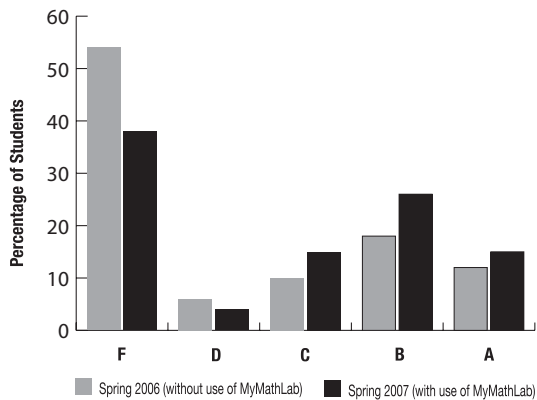


Figure 1. Grade Distribution, Spring 2006 and Spring 2007

Conclusions

MUN has evidence that by providing the kind of structural, step-by-step support necessary for mastery learning, MyMathLab may help students achieve better results. The large number of examples available for review at each student’s individual pace would take a prohibitive amount of time during a lecture. This feature alone proved MyMathLab a valuable tool for student self-practice.

A MUN survey of MyMathLab students indicated that the program did promote self-motivation: 86 percent of students surveyed reported that they used the computer lab twice a week. Seventy percent of students also reported that they found the software user-friendly.

Inspired by the preceding results, MUN is considering two possible scenarios for future MyMathLab implementation:

	MPT Average	Precalculus Average	Percentage of A Students
Fall 2006 (without MML)	72%	85%	12.6%
Fall 2007 (with MML)	72%	88%	18.8%

Table 3. Comparison of A-Student Results in Fall 2006 and Fall 2007

students—thus making an even more remarkable gain over the previous year’s students.

Figure 1 illustrates an increase in the percentage of students earning an A, B, or C during spring 2007, the first semester that MyMathLab was used. Similarly, the percentage of students earning a D or F decreased with the use of MyMathLab.

In Table 3, the MPT average was the same for both semesters. This most clearly illustrates the MyMathLab advantage, because not only did the percentage of students earning an A increase by about 50 percent (from 12.6 percent to 18.8 percent), but those students’ precalculus average for the course is also higher.

- *MyMathLab as an integral part of the entire course.* In this case, MyMathLab would support every topic in the course, with a high correlation among MyMathLab exercises, in-class instruction, and assessment practices.
- *MyMathLab as a special part of the course.* In this scenario, MyMathLab would support only assessment, improvement, and review of basic algebra skills necessary for learning other topics in the course.

Submitted by Margo Kondratieva
Faculty of Education and Department of Mathematics and Statistics, and
Oana Radu, doctoral student, Faculty of Education
Memorial University of Newfoundland

Odessa College

Course Name Intermediate Algebra

Credit Hours Three

Semesters Covered Fall 2004–Spring 2007

Type of Data Reported Success Rates



Textbook in Use with MyMathLab

Elementary and Intermediate Algebra: Concepts and Applications, 3e, 2008, Bittinger, Ellenbogen, Johnson

MyMathLab Course Structure

Course Design

Students are placed in the course based on various factors (high school math, ACT, etc.) as well as on their willingness and interest to take a math course without a traditional lecture format.

Class meets twice a week for 80 minutes each and includes lecture and examples. There is a required one-hour-per-week lab component, during which students may work on homework assignments and get the help of a tutor.

Assessments

Students take four chapter tests and one comprehensive final. There are two versions of every test and no quizzes.

MyMathLab Implementation

Use of MyMathLab contributes 100 percent to each student's final course grade. All homework is done outside of class through MyMathLab. Paper tests are given but are composed via MyMathLab and printed and distributed during class. Students are encouraged to use the study plan, particularly when they are absent from class or need extra help.

Test scores are imported into the MyMathLab Gradebook. This provides a constant running average that becomes a final grade book at the end of the semester.

MyMathLab Course Results

Grade	Without MyMathLab			With MyMathLab		
	Fall 2004	Spring 2005	Fall 2005	Spring 2006	Fall 2006	Spring 2007
A	4%	11%	13%	39%	44%	42%
B	20%	31%	35%	39%	35%	22%
C	32%	31%	23%	14%	13%	12%
D	12%	17%	10%	4%	0%	12%
F	32%	10%	19%	4%	9%	12%

Table 1. Success Rates by Semester, Fall 2004–Spring 2007

Grade	Without MyMathLab	With MyMathLab
A	9%	42%
B	29%	32%
C	28%	13%
D	13%	5%
F	20%	8%

Table 2. Combined Success Rates

Conclusions

Tables 1 and 2 indicate a direct and positively significant relationship between the number of students who pass the course and their use of MyMathLab. The same is true for the number of students who received an A.

MyMathLab students succeed because they receive immediate feedback and are able to rework problems as many times as they wish. The ability to rework problems is a key to student success, as it reinforces the learning process.

Additions to this course will include weekly discussion boards focusing on study skills.

*Submitted by Theresa Evans, Mathematics Instructor
Odessa College*

Course Names Beginning Algebra, Intermediate Algebra

Credit Hours Two, Five

Semesters Covered Spring 2006–Spring 2008

Types of Data Reported Success Rates, Retention



Textbooks in Use with MyMathLab

Beginning Algebra, 4e, 2005, Martin-Gay; *Intermediate Algebra*, 4e, 2005, Martin-Gay

MyMathLab Course Structure

Course Design

Beginning Algebra includes three hours of lecture as well as homework and quizzes to be completed on MyMathLab. Students have three days to complete homework once a topic has been covered. Intermediate Algebra is designed in the same way, plus the addition of two hours of discussion per week.

Assessments

Both courses are graded as either satisfactory or unsatisfactory and comprise the following breakdown:

Homework	8 percent
Quizzes	15 percent
Tests	46.2 percent (<i>three, taken in class</i>)
Final	30.8 percent (<i>taken in class</i>)

MyMathLab Implementation

Implementation of MyMathLab in Beginning Algebra began in summer 2005 with one lecture, followed by use in all lectures in spring 2006. There are approximately 40 students in each section. Implementation of MyMathLab in Intermediate Algebra started in summer 2006 with one lecture, followed by use in all lectures in fall 2006—six sections with approximately 160 students in each section.

Both courses use homework, quizzes, and video clips of sample problems from MyMathLab, which contributes 23 percent to each student's final course grade.

Both courses import test scores and final exam scores into MyMathLab.

MyMathLab Course Results

University of Illinois at Chicago faculty have gathered data from the past six semesters and cite the following results.

Since MyMathLab implementation, both Beginning Algebra and Intermediate Algebra students now complete more than 90 percent of their homework assignments compared with approximately 70 percent before implementation.

Test scores in Beginning Algebra have improved about

30 percent; test scores in Intermediate Algebra have improved about 20 percent.

Pass rates have increased 30 percentage points in Beginning Algebra—from 50 to 80 percent—and 20 percentage points in Intermediate Algebra: from 60 to 80 percent.

Retention rates in both courses increased approximately 15 percent following implementation of MyMathLab.

Conclusions

Mathematics faculty at the University of Illinois at Chicago have concluded that the use of MyMathLab has significantly improved success rates in both Beginning Algebra and Intermediate Algebra.

Based on this data, faculty are expanding the use of MyMathLab from Beginning Algebra and Intermediate Algebra to other mathematics courses, including Finite

Math for Business (spring 2008) and Precalculus (fall 2008). In addition, they implemented a related Pearson product, MyStatLab, in Introductory Statistics (summer 2008).

*Submitted by Dibyen Majumdar
Professor of Mathematics, Statistics, and Computer Science
University of Illinois at Chicago*

Central Texas College

Course Names Pre-Algebra, Beginning Algebra, Intermediate Algebra

Credit Hours Zero

Semesters Covered Fall 2003–Summer 2007

Types of Data Reported Success Rates, D/F/W Rates



Textbooks in Use with MyMathLab

PreAlgebra, 5e, 2008, Martin-Gay; *Beginning Algebra*, 4e, 2005, Martin-Gay; *Intermediate Algebra*, 4e, 2005, Martin-Gay

MyMathLab Course Structure

Course Design

Courses are offered both on-site and online. All students use MyMathLab for homework; on-site students are required to spend a minimum of 12 hours per semester in the lab. Some instructors give quizzes.

Assessments

There is an in-class test for each chapter. Intermediate

Algebra includes a midterm. All courses include a comprehensive departmental final examination.

MyMathLab Implementation

MyMathLab homework and quiz features are used and contribute 15 percent to each student's final course grade. After MyMathLab implementation, online enrollment increased from 1.6 percent to 14.75 percent. Grades are imported from other sources.

MyMathLab Course Results

		A	B	C	69% or Below	Student Withdraw	Drop or Incomplete	Total Number	Passing Number	Completion Number	Pass Rate	Completion Rate	D/W Rate
ON-SITE	Pre-Algebra	200	477	560	606	227	580	2,650	1,237	1,843	46.7%	67.1%	30.5%
	Beg Algebra	152	241	623	794	280	645	2,835	1,116	1,910	39.4%	58.4%	32.6%
	Inter Algebra	75	222	391	684	309	447	2,128	688	1,372	32.3%	50.1%	35.5%
ONLINE	Pre-Algebra*	-	-	-	-	-	-	-	-	-	-	-	-
	Beg Algebra	2	23	10	22	10	19	66	15	37	22.7%	40.5%	43.9%
	Inter Algebra	1	3	4	13	16	19	56	8	21	14.3%	38.1%	62.5%

Table 1. Success Rates before MyMathLab Implementation*

*Taught only with MyMathLab support.

		A	B	C	69% or Below	Student Withdraw	Drop or Incomplete	Total Number	Passing Number	Completion Number	Pass Rate	Completion Rate	D/W Rate
ON-SITE	Pre-Algebra	239	377	403	346	190	368	1,923	1,019	1,365	52.9%	74.6%	29.0%
	Beg Algebra	169	359	531	705	254	435	2,453	1,059	1,764	43.2%	60.0%	28.1%
	Inter Algebra	50	112	227	258	180	211	1,038	389	647	37.5%	60.1%	37.7%
ONLINE	Pre-Algebra	34	44	22	20	34	50	204	100	120	49.0%	83.3%	41.2%
	Beg Algebra	11	27	43	85	44	120	330	81	166	24.5%	48.8%	49.7%
	Inter Algebra	7	18	26	51	77	86	265	51	102	19.2%	50.0%	61.5%

Table 2. Success Rates after MyMathLab Implementation

Conclusions

The positive change in pass rates indicated by Table 2 points to the conclusion that required use of MyMathLab increases success and retention rates. Plans include a study to ascertain the effects on pass rates when more-in-depth

use of the program—such as videos, study plans, and PowerPoints—are required as well.

*Submitted by Jenny Shotwell, Mathematics Professor
Central Texas College*

Course Names Introduction to Algebra, Basic Algebra, Algebra for College Students

Credit Hours Four

Semesters Covered Fall 2003–Summer 2007

Type of Data Reported Success Rates

Textbooks in Use with MyMathLab

Developmental Mathematics: Basic Mathematics and Algebra, 1e, 2008, Lial, Hornsby, McGinnis, Salzman, Hestwood;

additional material imported from *Introductory and Intermediate Algebra*, 3e, 2006, Lial, Hornsby, McGinnis

MyMathLab Course Structure

Course Design

DeVry University courses are offered on traditional full-service campuses, from satellite locations, and online. Teaching and learning are based on a Mastery Learning philosophy in which a grade of at least 80 percent is considered mastery level. The grading scale is as follows: A = 90 percent or above, B = 80–89 percent, and F = less than 80 percent.

The majority of classes are taught in eight-week sessions. On-site classes are held in a lab setting and meet eight hours per week. Students work in a self-paced environment, and many complete the three-course sequence in two sessions.

Assessments

Courses consist of an entry exam, a skill check, study plan assignments, homework, pretests, unit exams, and a final exam. Final-grade distribution is as follows:

- 80 percent Tests and final exam
- 15 percent Homework assignments
- 5 percent Participation and attendance

Students take a quiz after completing all homework for a unit and must score at least 80 percent to take the unit test. All tests and pretests take place in a proctored setting. Students may take unit tests three times and the final exam twice. Only the highest score is used.

MyMathLab Implementation

MyMathLab contributes 95 percent to each student's final course grade. All student work—homework, quizzes, and tests—is generated by and completed within MyMathLab. Individual course sections are copied by a campus coordinator from a master course.

All work is recorded in the MyMathLab Gradebook.

MyMathLab Course Results

Fall 2003 Without MyMathLab	Summer 2007 With MyMathLab
39.0%	65.1%

Table 1. Percentage of Overall A/Bs before and after MyMathLab Redesign

DeVry University operates year-round on a trimester basis. Each trimester is divided into two 8-

week sessions. In the trimester immediately preceding systemwide implementation of MyMathLab in summer 2005, the A/B rate was 39 percent. Summer 2007 on-site, full-campus 2007 A/B rates increased to 68.4 percent; overall A/B rates were 65.1 percent.

Conclusions

Redesign of DeVry University's entry-level mathematics courses resulted in a significant improvement in success rates, which have increased every trimester since implementation of MyMathLab. The goal of the redesign was to double the success rate to 80 percent, with an intermediate goal of 70 percent. During the spring 2007 trimester, 54 university centers and all 23 campuses offered at least one entry-level math course. Two campuses and 15 centers had

a success rate above 80 percent. Six campuses and 14 centers had success rates of 70 to 80 percent.

The Entry Level Math Team has sent a best-practice form around the system and plans on issuing a summary of best practices prior to the 2008 summer trimester.

*Submitted by Steve Dorfman, Associate Mathematics Professor
and Associate Director of Curriculum–Mathematics
DeVry University*

Quinsigamond Community College

Course Names Basic Mathematics, Beginning Algebra, Intermediate Algebra, College Algebra

Credit Hours Three

Semesters Covered Fall 2001–Fall 2007

Types of Data Reported Success Rates, Subsequent Success

Quinsigamond Community College



Textbooks in Use with MyMathLab

Basic College Mathematics, 7e, 2006, Lial, Salzman, Hestwood; *Introductory Algebra*, 8e, 2006, Lial, Hornsby,

McGinnis; *Algebra for College Students*, 6e, 2009, Blitzer

MyMathLab Course Structure

Course Design

In 2001, Quinsigamond Community College received a Title III grant to, among other things, strengthen developmental education. From 2001 to 2006, QCC redesigned its three levels of developmental mathematics. Since completion of the Title III grant, QCC has continued to support redesign efforts. All classes meet for three credit hours per week. All three levels are offered in computer classrooms, noncomputer classrooms, evening classes, fast-paced courses, and online courses, as well as at off-campus remote sites. Instructors are guided by an Instructor Resource manual, which includes a sample syllabus, course pacing, instructor information, group activities, quizzes, and exams.

Of the more than 6,600 QCC students, approximately 50 percent are traditional (18 to 22 years old), and approximately 83 percent of incoming freshmen test into at least one level of developmental mathematics. Approximately 70 percent of developmental mathematics courses are taught by adjunct faculty.

Technology is an integral part of the student learning experience. The phrase “Technology tools will be utilized” is included in all developmental mathematics course descriptions. All students, regardless of course experience, participate in a mandatory departmental, paper-and-pencil final exam. A score of at least 73 percent on the final exam is a prerequisite to the next level of mathematical studies.

Computer classrooms. Students experience a minilecture followed by independent computer work using MyMathLab. They have homework using MyMathLab, which they can do at home, at the drop-in Math Resource Center, or in the Harrington Computer Lab. Students may have quizzes and exams administered using MyMathLab.

Noncomputer classrooms. Students experience an interactive lecture format with group work, applications, etc. They are assigned homework using MyMathLab, which they can do at home, at the drop-in Math Resource Center, or in the Harrington Computer Lab. Students may have quizzes and exams administered using MyMathLab.

Evening classes. These classes are in three-hour formats and are held in computer or noncomputer classrooms, following the same outline as previously listed courses.

Fast-paced courses. These courses complete earlier than the traditional semester. Students use MyMathLab to support the learning experience. Classes are held in all different settings.

Online courses. All three levels of developmental mathematics are offered online and use MyMathLab content, homework, and assessments. Students must appear on-site to take the final exam.

Off-campus remote sites. QCC’s developmental mathematics is offered at off-campus remote sites, such as local high schools, nursing homes, and correctional facilities. Some use MyMathLab; others do not due to lack of Internet access.

Assessments

There is no required number of quizzes or exams each semester. Rather, each instructor dictates the number. All developmental mathematics students take a paper-and-pencil, multiple-choice final exam during final exam week. Students must score 73 percent or more to continue to the next level.

MyMathLab Implementation

All levels of developmental math have a predesigned course that they can copy and adjust for their learning environment. The location and format of the course dictate the

degree to which MyMathLab is used and its contribution to each student’s final course grade, which varies from 0 to 20 percent. All students purchase a book that comes with a MyMathLab code. Most, if not all, faculty utilize MyMathLab for at least homework. Campuswide training is available for Beginning and Intermediate MyMathLab Instructors. Training is also provided for the Gradebook, which is used for tracking student and class performance

and is a tool for early intervention. Using the Gradebook for retention purposes is emphasized. Since all instructors follow the same pacing and use MyMathLab to support homework assignments, the support centers on campus are always prepared, trained, and ready to assist.

Many instructors require attendance, and they import that grade into MyMathLab. Classes held in noncomputer classrooms import their paper-and-pencil-exam grade.

MyMathLab Course Results

During the period of course redesign (from 2001 to 2006), the following cumulative results were reported from Title III data:

- In Basic Mathematics, an overall 8 percent increase in student success from fall 2004 to fall 2006
- In Beginning Algebra, an overall 30 percent increase in student success from fall 2004 to fall 2006
- In Intermediate Algebra, an overall 11 percent increase in student success from fall 2003 to fall 2006

Table 1 shows the percent of students that passed the final exam and could therefore advance to the next level of mathematics. *Note:* This table shows only students who completed the semester and sat for the final exam; it does not include grades of X and W.

Course	Fall 2006	Spring 2007	Fall 2007
Basic Mathematics	80.4	80.7	80
Beginning Algebra	79.5	72.6	82
Intermediate Algebra	72.6	68	74

Table 1. Student Pass Rate Percentages, Fall 2006–Fall 2007

As students progress through the developmental mathematics program, they enjoy a higher level of success in College Algebra than do students who place into that level

Conclusions

QCC is confident that the present curriculum is strong and supports students. MyMathLab enables QCC faculty to deliver this curriculum in a unified manner. The Math Center (a student drop-in tutorial center) has increased its number of computers by more than 60 percent to meet student demand for computer mathematics support.

The full range of Title III data shows an increase in student success from previous semesters and a trend of strong academic success for students who complete the course.

directly. In 2006, 55.7 percent of students who placed directly into College Algebra finished the course with a grade of at least C; 61 percent of students who came from the developmental math program finished the course with a grade of at least C. See Figure 1.

Now that the Title III grant is complete, QCC is turning its focus toward student success—not in comparison to past years but in search of trends that emerge as the present successful model is maintained.

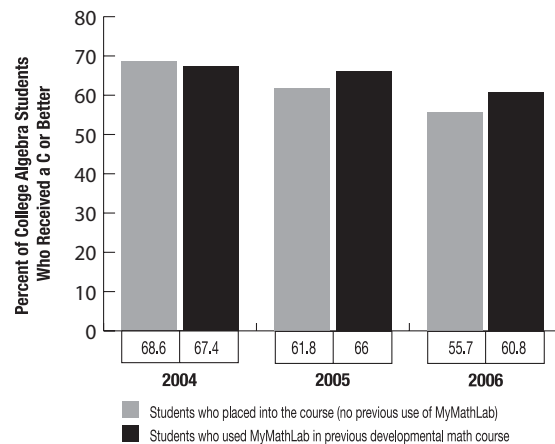


Figure 1. Student Pass Rate Percentages in College Algebra, Fall 2004–Fall 2006

Retention—decreasing the number of students who drop out or withdraw—remains a focus for the future. Students who complete the course have a very strong chance of passing the final exam: 75 percent of students who take the final exam score 73 percent or better, allowing them to advance to the next level of mathematics.

*Submitted by Andreana Grimaldo, Assistant Professor of Mathematics
Quinsigamond Community College*

Efficacy Studies

Florida Community College at Jacksonville

The mathematics department at Florida Community College at Jacksonville started using MyMathLab in 2002. Today, more than half of the mathematics faculty use the program to varying degrees.

Faculty report that use of MyMathLab “definitely makes a difference.” They note that some students know the program and like it so much, they seek MyMathLab-enabled courses for enrollment. “But both faculty and students need to understand that consistent, required use is necessary in order to achieve optimum student gain,” says Joel Rappoport, professor of mathematics.

Lab- and assessment-based users will find it no surprise that required use of the program, preferably in a controlled environment, for credit toward the final course grade begets the best results. Optional use of the program and use of the program only for homework may offer a benefit but simply do not achieve the maximum benefits for which MyMathLab was designed.

To help illustrate this point, Pearson hired Gatti Evaluation, Inc., to conduct a statistically sound and controlled study of MyMathLab effectiveness at FCCJ. The study was conducted during the spring 2006, spring 2007, and fall 2007 semesters and employed a quasi-experimental two-group baseline to postobservation design, with some course sections using MyMathLab for homework and others relying on paper-based homework assignments.

Students registered for the mathematics section of their choice. Participation was voluntary, and each professor had complete control over instruction for his or her sections, deciding whether or not use the MyMathLab system and if so, to what degree. Most course instruction was delivered via lecture. Students in the MyMathLab sections used MyMathLab to complete outside-of-class assignments, which accounted for significant portions of their final course grades.

Thirteen professors teaching 39 sections (29 of College Algebra and 10 of Intermediate Algebra) contributed 414 students to the final study sample. Students were

assessed at the beginning and end of the semester by means of the 30-question multiple-choice ACT Explore test and the ETS Assessment of Algebraic Understanding. At baseline, the MyMathLab and comparison groups were not statistically significantly different in mathematics achievement.

The sample was blocked into thirds (low, medium, high) based on baseline achievement score. Across the entire sample, MyMathLab students outgained the comparison group by 0.14 standard deviation, or 6 percentile points. In Intermediate Algebra, students who scored high on the baseline test and who used MyMathLab outgained

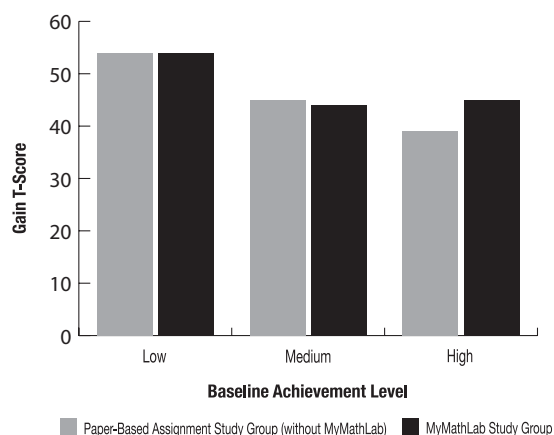


Figure 1. Achievement Gain T-Score for Intermediate Algebra Students by Baseline Achievement Level

the comparison group by 0.6 standard deviation, or 23 percentile points. See Figure 1.

The final study reported that “only the differential effect for MyMathLab students with baseline achievement in the upper third is statistically significant (i.e., 0.346 standard deviations, p -value = 0.0235, standard error = 0.175). This effect for the High baseline achievers, is predominately due to the Intermediate Algebra students (i.e., 0.600 standard deviations, p -value = 0.031, standard error = 0.357) rather than the College Algebra students (i.e., 0.084 standard deviations, p -value = 0.299).”

FCCJ faculty were pleased with the study and are hoping to use the experience to craft another that is more closely tailored to their students' needs and experiences. They suspect more evidence of gain will result. "Although the pretest and a posttest were nationally standardized tests, they don't necessarily match our course objectives and problems," says Rappoport. "Therefore, we aren't sure how hard students tried on them, as it wasn't counted as part of their grade."

Rappoport and the faculty at FCCJ are considering implementing and tracking their own changes in Elementary

High baseline achieving, Intermediate Algebra MyMathLab users outgained the comparison group by 0.60 standard deviation, or 23 percentile points.

—From *MyMathLab Efficacy Study: Final Project Report*
Guido Gatti, Gatti Evaluation, Inc.

Algebra by using a statewide exit exam for the pre- and posttests. They would apply the usage and weight of MyMathLab consistently and examine the effect of adding brief quizzes, which contribute to the final course grade.

Houston Community College

Susan Fife, mathematics professor at Houston Community College, organized and oversaw a department study using a Title V grant. Using Intermediate Algebra and College Algebra students in the fall 2005 and spring 2006 semesters, she examined the differences in achievement and retention between students who were assigned required MyMathLab homework versus students who were assigned homework solely from the textbook.

Intermediate Algebra is a traditional, lecture-only course comprising three hours of lecture and one hour of required lab time per week. Faculty recommend to students that they use the one-hour lab time for practice via MyMathLab or work sheets. Students were given four tests and one final exam, all of them paper and pencil. Homework for the control group was assigned from the textbook; homework for the treatment group was assigned from MyMathLab.

Tables 1 through 3 show Fife's results. Achievement was based on the results of the course final exam. Retention is defined as taking the pretest on the first day of class and

	Textbook Homework	MyMathLab Homework	Percentage Difference
Fall 2005	56.7%	60.9%	+7.4%
Spring 2006	65.0%	70.7%	+8.8%

Table 1. Comparison of Intermediate Algebra Final Exam Scores of Students Using MyMathLab and Textbook Homework

	Textbook Homework	MyMathLab Homework	Percentage Difference
Fall 2005	55.3%	51.3%	-7.2%
Spring 2006	46.3%	53.6%	+13.5%

Table 2. Comparison of College Algebra Final Exam Scores of Students Using MyMathLab and Textbook Homework

	Textbook Homework	MyMathLab Homework	Percentage Difference
Fall 2005	63.1%	77.4%	+22.7%
Spring 2006	60.0%	79.4%	+32.3%

Table 3. Comparison of College Algebra Retention Rates of Students Using MyMathLab and Textbook Homework

taking the final exam on the last day of class. Students were not retained if they took the pretest on the first day of class and did not take the final exam. Only students who took both the pretest and the posttest were considered in the calculation of achievement.

All but one semester showed significant increases in student achievement among those students who were required to use MyMathLab homework. Of particular note is the increased retention experienced in both semesters of College Algebra: 22.7 percent and 32.3 percent. See Table 3.

Overall, it appears that the assignment of online homework in a traditional lecture class helps increase student achievement, and at the college level, it also helps ensure students are retained.

Based on the data revealed in the study, Fife's future plans include assigning MyMathLab homework to her traditional, lecture based courses—both to help her students succeed in the course and to save grading and administrative time.

What Students Are Saying

Central Ohio Technical College

From a summer 2007 survey on student views of online homework in Basic Mathematics, Introduction to Algebra, and College Algebra courses. (N = 104)

How did online homework affect your learning?

23% Very positively
42% Positively

Did you feel that your instructor addressed your concerns regarding online homework as much as possible?

86% Yes

Would you recommend this homework method for future math students?

40% Most definitely
28% Definitely

If you had it to do over again, what would you choose?

81% Online homework

College of the Sequoias

From a fall 2007 survey of Intermediate Algebra students. The course meets four hours per week. Outside of class, students complete a MyMathLab homework assignment for each section covered in the text, and two quizzes in MyMathLab for each chapter covered. See page 14 for more information about the class structure. Professor comments are in italics. (N = 50)

How much time and effort have you devoted to this course compared with your previous math courses?

Slightly more 30%
Much more 46%

This suggests that the contract and MyMathLab may have had a positive impact on the amount of effort given by students.

How much has the grading policy affected the time and effort you have devoted to this course?

Somewhat 12%
Some 16%
A lot 68%

This clearly shows that the grading policy and contract did affect the amount of time and effort devoted to the course.

How much has MyMathLab increased your understanding of the material in this course?

Not at all 0%
2%
Somewhat 32%
16%
A lot 50%

This clearly shows that MyMathLab has a positive effect on student understanding.

If given a choice, would you take your next math course using MyMathLab?

Yes 90%

This is quite an endorsement of MyMathLab.

Louisiana State University

From a fall 2007 survey of College Algebra students. (N = 1,524)

Did you buy a textbook for this course?

89% Yes
11% No

In an average week, how many hours do you spend working in MyMathLab in the lab?

85% 1–4 hours
14% 5–8 hours
1% More than 8 hours

In an average week, how many hours do you spend working in MyMathLab outside of the lab?

38%	0 hours
58%	1–4 hours
3%	5–8 hours
1%	More than 8 hours

What grade do you expect to earn in this course?

45%	A
42%	B
12%	C

*From a fall 2006 survey of College Algebra students.
(N = 1,161)*

98%	Yes, I usually completed the homework exercises in MathXL in a timely manner.
99%	Yes, I got help from the <i>Help Me Solve This</i> or <i>View an Example</i> buttons to work the exercises in MathXL.
63%	Yes, using MathXL made me a better problem solver.
60%	Yes, using MathXL made me more confident in learning mathematics.
83%	Yes, using MathXL helped me learn the mathematics.
62%	Yes, using MathXL helped me try hard to solve math problems.
81%	Yes, the teacher assistance during lab time on homework was helpful and sufficient.
70%	Yes, the teacher assistance during lab time on quizzes was helpful and sufficient.
60%	Yes, I would recommend this course format to a friend.

Michigan State University

From a fall 2007 survey of Calculus 1 students. (N = 25)

96%	Yes, I thought that MML was easy to use.
100%	Yes, I liked immediately knowing when I got a problem wrong.
92%	Yes, I reworked the problems that I got wrong.

University of Alabama

From a fall 2007 survey of students who use the Mathematics Technology Learning Center. (N = 3,328)

How much time did you spend weekly on work for your math course?

5.6%	1 hour or less
28.8%	1 1/2 to 2 hours
34.9%	2 1/2 to 3 hours
22.1%	3 1/2 to 4 hours
8.6%	4 1/2 hours or more

This is a good course.

46.5%	Tend to agree
34.8%	Strongly agree

It was helpful to be able to choose my own times to work.

23.0%	Tend to agree
69.4%	Strongly agree

Being able to work practice problems with the computer helped me learn the material.

38.6%	Tend to agree
41.0%	Strongly agree

Having deadlines for assignments and quizzes helped me keep up with the work for my math course.

41.3%	Tend to agree
43.7%	Strongly agree

This course encouraged me to take responsibility for my own learning.

40.6%	Tend to agree
47.7%	Strongly agree

This course encouraged me to search for answers myself before asking others.

51.2%	Tend to agree
33.5%	Strongly agree

It was helpful to receive feedback and see the results of my work almost immediately.

29.4%	Tend to agree
65.4%	Strongly agree

What grade would you give to this course?

35%	A
36%	B
19%	C

Central Ohio Technical College

“I loved the online homework! I hope all math classes are like this!”

“The online homework was a huge help because it shows you the answer immediately, where book work doesn’t always. By the time you get your homework back, you’ve forgotten your problems.”

“I really enjoyed the online version. It allowed me to work at my own pace.”

“Math is my worst subject, but with MyMathLab I really enjoyed doing the homework and better understood the material that was covered!”

“It was great! I wish every class would have homework set up like this!”

“I learned more from online homework.”

Florence-Darlington Technical College

“I didn’t like math at the beginning of the year, and now I enjoy it.”

“Math is much easier this way.”

“They should have MyMathLab for every math class.”

“I love it. It’s a really good source of help.”

“It’s awesome!!!!!!”

“MyMathLab is a great tool and is a godsend for students like me who are math challenged.”

Massasoit Community College

“I was very nervous about taking this class because I am not much of a math person. But I have found that I have been doing so much better than I had expected due to all of the great resources in MyMathLab. The ability to keep practicing over and over until I get it, the ability to see an example and explanation of how a problem is done, and the ability to go in and find out what I need to practice more is phenomenal. Having all of these resources online is like having a personal tutor for the class.”

Northern Virginia Community College

“[With MathXL] I was able to work at my own pace. I didn’t feel like I was pressured to keep up with anyone, and I didn’t feel like I was being held back by anyone.”

Onondaga Community College

“I think MyMathLab is one of the greatest sites ever! It does an unreal job of allowing students to learn from their mistakes. This site is extremely easy to work with—I highly recommend it.”

University of Central Arkansas

“MyMathLab is like having my own personal tutor guiding me through the challenges of mathematical equations. More important, MyMathLab is at my disposal and at my convenience, which is an enormous asset. MyMathLab instructs me step-by-step through each math problem, allowing me to learn each crucial part of the equation-solving process at my own pace. This wonderfully helpful program allows me the freedom to repeat this process an infinite number of times on the same mathematical equation without feeling like I’m burdening an instructor’s time schedule. I earned a 4.0 [grade point average], and without MyMathLab I probably wouldn’t have been this successful at math.”

University of Missouri–Columbia

“This has pretty much been the only thing ever to help me grasp concepts in math. I hope that you keep it for future semesters.”

University of South Florida

“My learning experience in this class helped me catch up on material that I had forgotten and in turn affected my performance in my other classes in a positive way.”

“I like that MyMathLab lays out all of the things that I need to study. It keeps things in order, keeps me on track, and helps me learn how to solve all of the problems needed to pass the course. I never would have thought that I could have this much help in math while taking it online.”

For more information on what students are saying about MyMathLab, visit the MyMathLab Web site.

Student testimonials:

<http://www.mymathlab.com/testimonials.html>

Videos of MyMathLab in action:

<http://www.mymathlab.com>

What Instructors Are Saying

Central Ohio Technical College

During autumn 2007 I had two Introduction to Algebra students who got Ds on their first test. I encouraged them to use the Study Plan for extra practice. They worked all the problems offered by the Study Plan, and one earned an A in the course, and the other one earned a B.

A lot of results come down to students' being willing to work hard. However, having good tools to use is as important. Doing problems solely from the textbook is not effective. Students willingly turn in homework with wrong answers—they give up. With MyMathLab the students live to see the “correct” button pop up. They want to get all the problems right and have the resources to do so. All of our full-time teachers use MyMathLab for homework, and it's won over many of our adjuncts.

—Sandra Siegrist

Eastern New Mexico University, Roswell Campus

There is no comparison between Pearson training and support and the competition! When I call or e-mail for help—whether from my rep or from the MathXL faculty support line—I always get the help I need. I have never had an experience of not hearing back from someone.

Students who take advantage of what MathXL has to offer are the ones who do better at test time!

—Janet Macaluso

Fayetteville Technical Community College

MyMathLab is a remarkable online instruction and resource delivery system. The new resources and features have increased the success of my students. It's a must for online math instruction.

—Betty Jo Major

Georgia Perimeter College

I use MyMathLab in all of my classes. My students love the technology, and its resources and features empower them to be successful—especially students who have previously struggled with math. Now, nearly 100 percent of my students complete their assignments!

—Carolyn Spillman

Harrisburg Area Community College

It is so easy to set up and manage a MyMathLab course Web site for an Internet math course. Posting schedules and expiration dates of announcements, homework assignments, and online tests can be done ahead of time. I won't use another package to run my online math courses.

—O. Pauline Chow

North Hennepin Community College

My students have good things to say about MathXL. They get immediate feedback and help, which enhances their feelings of success. It's not a panacea, but I've really enjoyed using MathXL. I no longer dread assigning homework for credit because I no longer face those big stacks of papers!

—Nicole Lang

Sam Houston State University

My students are really learning and working hard because they are getting the help and reinforcement that they've always needed in a math class. It's wonderful! I am enjoying this semester more than any other semester because so many students are getting motivated and are enjoying math! This is a teacher's dream!

—Linda Tredway Wright

San Joaquin Valley College

My highlight this week was a student who had previously failed Math 200. She came in very stressed. I got her started in MyMathLab, and by midweek, she said, “Wow, I never thought I would say this, but I'm starting to like math!”

—Rudy Roberts

Tarrant Community College

I have had several students thank me for providing access to homework and tutorials online. The biggest difference has been the help for students with learning differences. The ability to do repetitions until the skill has been mastered helped one woman get her first A in mathematics.

—Greta Harris-Hardland

Conclusion

Several themes arise within this report. The placement of case study data side by side reveals emerging patterns as well as clear cause-and-effect correlations.

The Correlation between Required Use and Student Gains

The most prominently observable and powerful correlation is the direct effect that required use has on student gains. The most student gains are seen in those schools where MyMathLab or MathXL is most fully integrated into the curriculum—where usage is required and weighted as a significant percentage of the final course grade.

The University of Alabama uses the majority of features offered in MyMathLab, including customization, homework, quizzes, tests, and prerequisites—contributing 93 percent of each student’s final course grade. After a course redesign incorporating MyMathLab in fall 2003, Intermediate Algebra success rates increased from an average of 50 percent to an average of 75 percent in fall 2007.

In those schools where MyMathLab or MathXL is most fully integrated into the curriculum—where usage is required and weighted as a significant percentage of the final course grade—the most student gains are seen.

Gains aren’t limited to large institutions. Anywhere MyMathLab or MathXL becomes increasingly integrated—through percentage contribution to final course grade, number of teachers who are adept at implementation, and even student word of mouth—achievement increases. Odessa College requires MyMathLab for homework, uses it to compose tests, and refers students to its study plan as needed (totaling a 100 percent contribution to each student’s final course grade). A comparison of success rates before MyMathLab implementation in spring 2006 and after shows that the longer required usage was sustained,

the more student gains increased. The percentage of earned grades of A increased from 13 percent in fall 2005 to 42 percent in spring 2007.

Yavapai College purposefully carried out its initial fall 2004 implementation slowly. “We allowed the program’s success and ease of use to speak for themselves and thereby converted hesitant faculty and students,” says David Graser of Yavapai College. “The more students used MyMathLab, the more future students expected to use the product. Similarly, the more MyMathLab was used, the more pass rates and retention rates increased. Today we use MyMathLab in almost every math course.”

The Correlation between Effort and Achievement

Studies demonstrate that a shift in student thinking from a focus on ability to a focus on effort increases students’ engagement in mathematics learning, which in turn improves students’ mathematics outcomes. That is, when students connect the concept of effort to the capacity to succeed, they increase their persistence to learn. The authors of Foundations for Success, a 2008 report by the National Mathematics Advisory Panel of the U.S. Department of Education found that “an increased emphasis on the importance of effort is related to improved mathematics performance. This is a critical point because much of the public’s self-evident resignation about mathematics education . . . seems rooted in the erroneous idea that success is largely a matter of inherent talent or ability, not effort.”

Faculty at Louisiana State University tracked this time-on-task phenomenon for the fall 2006 semester of College Algebra. The faculty’s data reinforces the positive correlation between effort and achievement: 90 percent of students who completed 70 to 100 percent of the minimum class and lab time participation requirements earned grades of A, B, or C. Conversely, of those students who completed 0 to 69 percent of the participation requirements, only 39 percent received grades of A, B, or C.

Use of interactive courseware, like MyMathLab and MathXL, promotes student engagement in the material and expo-

nentially increases the likelihood of participation. “Students’ learning habits have changed tremendously in the past 10 years,” says Jeanne Foley of the University of Wisconsin–Stout. “Although it does seem that students’ attention span for lectures and ability to focus for extended times on traditional assignments has diminished, their willingness to spend one or two or sometimes even three hours a day on interactive homework like the MyMathLab exercises has increased. Students in UW-Stout Intermediate Algebra classes are spending an average of 95 minutes a day on their MyMathLab homework—far more than they were doing when these classes were taught traditionally.”

George Woodbury of the College of the Sequoias has developed a student contract—a method of increasing student usage of and time on MyMathLab via a creative blend of required use and conscious student choice. The contract has proved itself a successful motivational tool with significant results. Fall 2007 success rates were 19.1 percent higher with use of the contract than previous semesters’ rates and 20.2 percent higher than the campus average for the same period.

The Correlation between MyMathLab/MathXL and Subsequent Success

When students make the connection between effort and achievement, that lesson stays with them and assists them throughout their college career. In this way, MyMathLab and MathXL do more than generate great results: they revolutionize how students learn.

Jamie Glass of the University of Alabama reports that “Longitudinal studies have increased UA’s awareness of MyMathLab’s impact on subsequent success. By 2006, those students who came out of a MyMathLab-redesigned Intermediate Algebra class passed their subsequent class, Precalculus Algebra, at an average rate of 71.3 percent compared with the overall average of 48.3 percent.”

At Lone Star College–Montgomery, faculty tracked the pass rates of students who had completed the MyMathLab outcomes assessment program in the previous course and compared them with the pass rates of those who had not. For every semester tracked and for every course—Introductory Algebra, Intermediate Algebra, and College Algebra—the data shows higher pass-rate statistics for those who used MyMathLab in their previous course.

Andreana Grimaldo of Quinsigamond Community College compared the success rates of students who progressed through QCC’s MyMathLab-redesigned developmental program and those who placed directly into College Algebra. Her data reveals that students who previously use

MyMathLab enjoy a 10 percent higher level of success in College Algebra than do students who place into that level directly.

The Correlation between MyMathLab/MathXL + Textbook Usage and Student Success

As tuition, room and board, and other college education costs soar, many scapegoat the cost of textbooks. The result is a misperception of the product and its impact on a landscape of online courseware and other information technology. It bears noting that in the most successful MyMathLab and MathXL programs in the United States and Canada, for every single case, instructors use the physical, title-specific textbook that the program was designed to complement. While information technology has forever altered the higher education experience, it is not a substitute for good teaching. Similarly, reliance on technology for technology’s sake alone falls short of the greater potential that technology holds when it is not the focus of the teaching-learning process, but rather the enabler.

Today more than ever, we have the ability to reframe the learning of mathematics from an impenetrable mystery to a foundational skill accessible to all. We have the knowledge right now: the proven redesigns promoted by the National Center for Academic Transformation and the successful redesigns undertaken by those two- and four-year institutions that have fully integrated courseware systems like MyMathLab and MathXL into their curricula. According to an October 2007 survey,¹ however, only 9 percent of intermediate algebra instructors base at least 20 percent of the final course grade on online courseware-assisted homework. What stands in the way of the remaining 91 percent of instructors? They are “uncertain that online homework systems make a difference in class results.”

You hold in your hand proof of that difference. This report unequivocally shows that sustained, integrated use of MyMathLab and MathXL improves student learning. In addition, the MyMathLab and MathXL programs take it one step further: they both deliver the instruction and measure the results. The programs themselves tracked and recorded the data that enabled us to communicate these best practices to you and to the higher education community at large. It is our sincere wish that you will take advantage of the power of this tracking capability to share with others that all is not bad news, that students can learn—and even enjoy—math. We look forward to hearing of your students’ achievements.

1. Value of Online Homework and Tutorial Systems in Intermediate Algebra, Fall 2007, J. Burger and S. Reichlin. Pearson Education, 2007.

Glossary of Terms Used in This Report

To ensure clear and consistent understanding of the terms used in this report, we have taken the liberty of defining several of them here. Please note that these definitions are simply for the purposes of this report and do not necessarily reflect either official or dictionary-true versions.

Completion rate is the percentage of students who registered for a course and completed the course through the final exam, excluding those students who officially dropped (withdrew from) the course. This is also called the retention rate.

Course redesign is the process of restructuring the way the content of a course is delivered. It generally involves redesigning a whole course (rather than individual classes or sections) usually to achieve better learning outcomes often at a lower cost. This usually is done by taking advantage of the capabilities of technology. Course redesign is most effective in large-enrollment courses.

Distance-learning course is a course where students do not have regular face-to-face class meetings and do not have to maintain a regular presence on the particular campus that is granting the credit. Most if not all learning activities are conducted online. This type of course is also called an online course.

Drop/fail/withdraw (DFW) rate is the percentage of students who register for a course and at the end earn a grade of D, F, or W (drop, fail, or withdraw) in the course.

Hybrid course is a course that has some face-to-face classroom activities and some online activities.

Integrated use refers to the fact that an instructor makes MyMathLab or MathXL a part of the syllabus and assigns work to be completed by the student.

Lab-based course is a course where much if not all of the student learning takes place in a computer lab where students work independently and use technology to enhance learning. This type of course is called the emporium model when there is no face-to-face meeting in a traditional classroom setting.

Online course is a course where students do not have regular face-to-face class meetings and do not have to maintain a regular presence on the particular campus

that is granting the credit. Most if not all learning activities are conducted online. This type of course is also called a distance-learning course.

Pass rate is the percentage of students whose final grade is A, B, C, or D. This is not the same as the success rate, because the grade of D is included in the pass rate.

Required use means an instructor mandates the use of MyMathLab or MathXL by students for an individual grade that is part of the final course grade. It is the opposite of optional use.

Retained students are those students who registered for and completed the course through the final exam. This excludes those students that officially dropped (withdrew from) the course.

Retention rate is the percentage of students who registered for a course and completed the course through the final exam, excluding those students who officially dropped (withdrew from) the course. This is also called the completion rate.

Subsequent success (in this report) refers to the success that students experience in higher-level courses due in part to their having first successfully completed other, lower-level MyMathLab courses.

Success rate is the percentage of students who registered for a course and earned a final course grade of A, B, or C. Note that a final grade of D is not included in the success rate.

Traditional course is a course that continues being taught the same way it has been for many, many years. This usually involves the lecture format where students sit passively, and usually there is no technology component.

Various formats refers to institutions' using varied implementation models to teach with MyMathLab or MathXL.

List of Contributors

Annette Burden, Youngstown State University
Pauline Chow, Central Pennsylvania Community College
Teresa Chung, University of West Florida
Steve Dorfman, DeVry University
Alexis Evans, Chicago State University
Theresa Evans, Odessa College
Susan Fife, Houston Community College
Jeanne Foley, University of Wisconsin–Stout
Jamie Glass, University of Alabama
James Graham-Eagle, University of Massachusetts–Lowell
David Graser, Yavapai Community College
Andreana Grimaldo, Quinsigamond Community College
Susan Haley, Florence-Darlington Technical College
Santee House, Georgia Perimeter College
Susan Knights, Boise State University
Margo Kondratieva, Memorial University of Newfoundland
Maureen Loiacano, Lone Star College–Montgomery
Dibyen Majumdar, University of Illinois at Chicago
Michael Masterson, Michigan State University
Paul Musial, Chicago State University
Brooke Quinlan, Hillsborough Community College
Oana Radu, Memorial University of Newfoundland
Joel Rappoport, Florida Community College at Jacksonville
Phoebe Rouse, Louisiana State University–Baton Rouge
Jenny Shotwell, Central Texas College
Sandra Siegrist, Central Ohio Technical College
Kirk Trigsted, University of Idaho
Shawn Wood, Mesa Community College
George Woodbury, College of the Sequoias

PEARSON



75 Arlington Street, Suite 300, Boston, MA 02116
617 848 6000 • www.mymathlab.com