



Making the Grade

A Report on the Success of MyMathLab
in Higher Education Math Instruction



BY MICHELLE D. SPECKLER

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Making the Grade: A Report on the Success of MyMathLab in Higher Education Math Instruction

By Michelle D. Speckler

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Introduction

America's higher education industry is in crisis. Even with increased access to information technology, which many hoped would reduce the cost of delivering education, costs associated with higher education continue to outpace the rate of inflation.

What's at risk is more than just a larger slice of the consumer's pie. For many Americans, the American dream itself—the ability to educate our children so that they may achieve a level of success beyond our own—is becoming an increasingly distant possibility as colleges nationwide respond to the pressing issues of cost containment, competition, funding cutbacks, and declining revenue by raising tuition to record levels.¹

And yet cost is not the only obstacle contributing to the crisis. Student success—or the lack thereof—is another. The July 2005 edition of *The Learning Marketplace*, the electronic newsletter of the National Center for Academic Transformation, reports that 60 percent of students at public institutions fail to complete degrees within five years, and that 50 percent of those students leave school during their freshman year. According to the National Center for Education Statistics, nearly half of first-time students who leave their initial institutions by the end of their first year never return to higher education.

What's Gone Wrong?

It's been more than 25 years since information technology began permeating higher education. In that time, we have indeed seen that increases in academic productivity are possible through the integration of technology-rich educational environments and delivery systems. There is evidence of the same with regard to cost reduction and quality of service. Perhaps more important, however, is how the experiments of the past few decades have produced a disparity gulf that separates our expectations from the current reality. It turns out that where we are now is not the result of using or not using information technology in higher education. It is the result of *how* we use it. All too frequently universities facing

issues of increased costs, low pass rates, or large enrollments pin their hopes on solutions that are simply bolted onto the existing infrastructure. In these cases, expensive technologies are added on to existing teaching and learning models. In order to realize the potential of information technology for improving the quality of education, reducing cost, and increasing access, we need to rethink and reshape that model.

As long as we continue to replicate traditional approaches online we will once again find the “no significant difference” phenomenon vis-à-vis quality, and we will make only a negligible dent in the access problem rather than taking full advantage of the networked environment.

—Carol Twigg, President
National Center for Academic Transformation

This report will illustrate how one product, Pearson Education's MyMathLab™, has successfully reshaped how math is taught and learned in college mathematics courses. Institutions are finding they can save money without jeopardizing quality. Faculty are finding more time for students and spending less time on mundane administrative tasks. Most important, students are more motivated to do more homework, they're retaining more knowledge, and they're passing their classes the first time around. This report will illustrate that these things are not only possible; they're actually happening right now in the institutions cited within this report—and among 1,100 other institutions around the nation. This is the power of MyMathLab online courseware.

¹ The cost of attending a public four-year institution rose by 22 percent between 2001–2 and 2004–5, and tuition and fees for in-state students at the institutions grew by 33 percent, according to Postsec-

Taking Action

A college's purpose is not to transfer knowledge but to create environments and experiences that bring students to discover and construct knowledge for themselves, to make students members of communities of learners that make discoveries and solve problems. The college aims, in fact, to create a series of ever more powerful learning environments.²

MyMathLab (MML) is an innovative series of text-specific online courses designed to work hand in hand with Pearson Addison-Wesley and Pearson Prentice Hall mathematics and statistics textbooks. Unlike other online products, MML isn't an expensive add-on. It's a revolutionary new way of teaching and learning—and it works. Institutions across the country are reporting increases in pass rates of 30–40 percent at less cost to the institution than traditional courses.

What Makes MyMathLab Different?

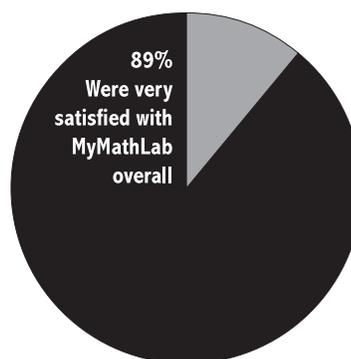
The linchpin of MML's success is its focus on the student. MML is modularized, self-paced, deliverable anywhere with Web access, and adaptable to each student's level of knowledge. Unlike the traditional, lecture-based model of course delivery, wherein students are passive recipients of information, MML enhances course delivery by engaging students in active learning. They learn at the time, in the place, and according to the style and pace that best suit them. Students surveyed about their experience with MML are overwhelmingly positive (see *Chart 1 at right*).

Faculty also benefit from MML. By transferring the tasks of content delivery, student assessment, and grading to a powerful suite of course management tools, MML enables faculty to spend more time with students.

A powerful example of MyMathLab's success can be found in a report recently submitted to *Florida Scientist*

Chart 1. Student Survey Results

From a fall 2004/spring 2005 national survey of students using MyMathLab (conducted by Pearson Education)



entitled “Significant Differences in Student Performance between Students Who Do and Do Not Utilize Course Compass,” by Jacquelyn A. White, Associate Professor, Department of Mathematics and Sciences, Saint Leo University, Saint Leo, Florida. The study examined final exam scores of distance education students who utilized MyMathLab and those who did not. Significant differences were found in student performance between students who utilize MyMathLab as a learning tool and those who do not take advantage of the new learning support packages.

ondary Institutions in the United States: Fall 2004 and Degrees and Other Awards Conferred: 2003–04, issued September 2005 by the U.S. Education Department. The report also states that, “driven largely by the significant cutbacks in state general fund expenditures on higher education during the early part of this decade, public four-year colleges

saw the biggest increases in student charges from 2001–2 to 2004–5.” To read more, download the report at <http://nces.ed.gov/pubs2005/2005182.pdf>.

² Barr, R.B., and Tagg, J., “From Teaching to Learning: A New Paradigm for Undergraduate Education.” *Change*, Nov./Dec. 1995.

The population for this study consisted of students enrolled in Finite Mathematics at three of sixteen centers at a Catholic college. The three centers consisted of the main campus and two online centers.

The centers selected for this study enrolled over 6,000 students in credit-level courses during the fall 2004 term. The sample for this study comprised 193 students enrolled in Finite Mathematics (MAT 141) at the target centers during fall 2004 and spring 2005.

Data included final exam scores, final course grades, and active use of MyMathLab collected during Spring I and Spring II 2005 from an online center open to all college students. Sections of Finite Mathematics were taught by the same instructor at the same online center.

The study concludes with the following:

The results of the ANOVA indicate that we should reject our hypothesis that indicated there is no significant difference in final exam scores of students in Finite Mathematics, between students grouped by use of MyMathLab. Specifically, the mean final exam score for students who utilized MyMathLab was 83.4 percent. While the mean final exam score for students who chose not to use supplemental learning materials available in MyMathLab was 72.1 percent.

... The utilization of learning resources does have a significant effect on final exam scores in Finite Mathematics. Student final exam scores were significantly higher for students who utilized MyMathLab as a learning resource in online sections of Finite Mathematics.

How MyMathLab Works

Since 2001 approximately 1 million students have used MML and an alternate version, MathXL®. Today, more than 1,100 colleges and universities use MML or MathXL, and since January 2005, 350,000 students have enrolled in an MML or MathXL course. One of the reasons MML works so well for so many is its flexibility. “It doesn’t matter how you use it—lectures, completely online, the R2R emporium model, or a hybrid of the traditional model,” says Phoebe Rouse, Precalculus Mathematics Coordinator at Louisiana State University–Baton Rouge, “this software will help

Picking out my favorite things about MyMathLab is like a kid being in a toy store and being told to pick out favorite toys. There is just too much to pick from!

—Gwen Terwilliger
University of Toledo

your students do more math and therefore learn more math.” The rich set of course materials and adaptable instructor tools outlined here make it easy to use the entire program, a portion of the program, or the homework option only.

Online course content and customization tools. Content is tightly integrated with Pearson Education textbooks (Pearson Addison–Wesley and Pearson Prentice Hall), and it can be added to, removed, or modified effortlessly. MML also provides the communication tools needed to create a supportive online community such as a discussion board, a virtual classroom, and chat capabilities.

Multimedia learning aids. In addition to extensive online tutorial exercises, MML courses include multimedia resources—such as video lectures and animations—that are accessible from an online version of the textbook. With those resources, students can link to learning aids directly from examples and exercises that appear in the online text. Videos and animations are also accessible from individual online homework and practice exercises.

Homework manager. Instructors can create and manage online homework assignments that are graded automatically. Homework assignments can be selected from an online bank of exercises that correlate to textbook exercises. In most courses, instructors can also create their own exercises. Most exercises include guided solutions and sample problems to help students understand and master mathematical concepts.

Flexible assessment system. MyMathLab’s Test Manager enables instructors to create, import, and manage online

Chart 2. Instructor Survey Results

From a spring 2003 survey of faculty using MyMathLab (conducted by Pearson Education)

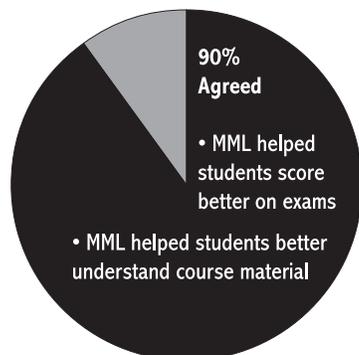


Chart 3. Instructor Survey Results

From a spring 2003 survey of faculty using MyMathLab (conducted by Pearson Education)

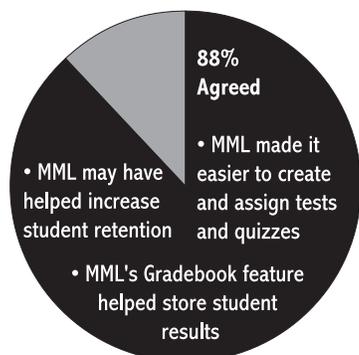
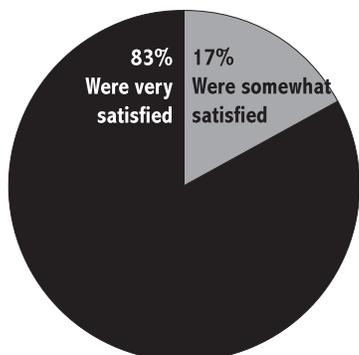


Chart 4. Instructor Survey Results

From a spring 2003 survey of faculty using MyMathLab (conducted by Pearson Education)



0% Were somewhat unsatisfied • 0% Were very unsatisfied

Overall Satisfaction Level of Faculty

assessments with chapter tests that are built in and editable. Instructors can also create tests by choosing from an online bank of test items that correlate to the textbook, or by creating their own exercises. A range of options are available for assigning and managing online tests, including:

- How long tests are available to students
- How many times students can take a test
- Time limits for tests
- Passwords for proctored test environments
- Whether and how many times students are allowed to review a test
- Whether students can retake an incomplete test

Student study plan for self-paced learning. The Study Plan generates personalized study plans for students based on their test or quiz results. It links directly to tutorial exercises that cover topics a student may still need to work on. Those exercises regenerate algorithmically to provide unlimited practice. The Study Plan is updated each time a student takes a test or quiz, so students can monitor their progress throughout the course.

Gradebook tracking. The online gradebook—designed specifically for mathematics and statistics—automatically tracks students' results on tests, homework, and tutorials. Grades can be exported to a spreadsheet program such as Microsoft Excel.

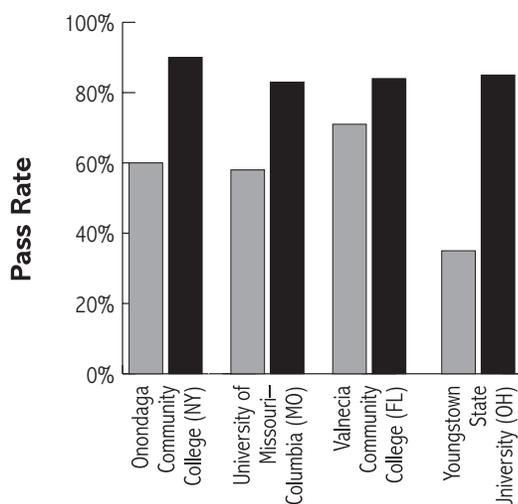
Free tutoring for students from the Math Tutor Center. Students can sign up for free math tutoring from the Math Tutor Center. The center is staffed by qualified mathematics instructors who provide one-on-one tutoring via toll-free phone lines, e-mail, and real-time Internet sessions. Tutors can assist students by explaining examples and reviewing solutions.

MyMathLab Faculty Advocates

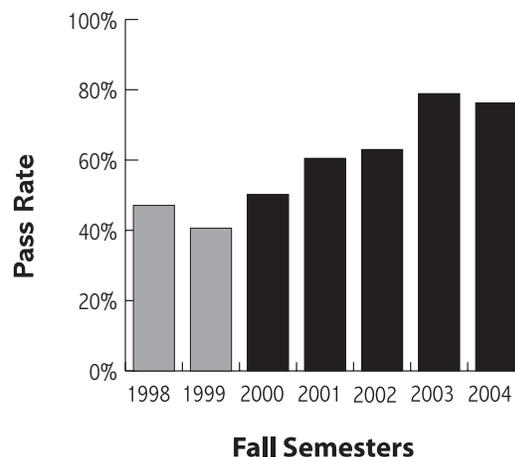
Surveys indicate that faculty are unequivocal about their support for MyMathLab (see Charts 2–4 at left). Interviews conducted for the purpose of this paper further revealed the MML Faculty Advocate program as one of faculty users' most appreciated features. Built upon the proven effectiveness of peer-to-peer advising, the program offers access to a nationwide network of faculty advocates—college instructors experienced in teaching with MyMathLab—to advise and counsel math faculty

Table 1. Pass Rates across the Country

Black areas indicate pass rates with MyMathLab in use.

**Table 2. University of Alabama Pass Rates**

Black areas indicate semesters with MyMathLab in use.



currently using MML or those interested in incorporating it into their courses. Faculty advocates provide phone coaching and support, conduct campus demonstrations, and present MML at conferences and workshops.

As power users of MML, faculty advocates provide the Pearson Math Media Development team with critical user information to steer upgrades and enhancements to the platform. Advocates and Pearson staff meet formally and informally throughout the year in person and via telephone, e-mail, and online demonstrations. As one staff member described it, “It’s a constant feedback loop.”

Responsive Customer Service

Faculty users of MyMathLab can be confident that they’ll receive top-notch customer service for both their own technical questions and those of their students.

“Customer service was an integral reason to go with MyMathLab,” says Steve Dorfman, National Mathematics Curriculum Manager at DeVry University. “It’s just fantastic. At DeVry, students perform all their own software installation and downloads. All we do is provide them with MML’s customer service number. I consistently receive the same feedback: students call and have a great experience. ‘They stayed with me until I was done,’ they say. Or, ‘I can’t believe I spoke to a real person who knew what they were doing!’ It gives them a tremendous amount of confidence.”

Measurable Results

The following student results from schools across the country, as well as those reflected in Tables 1 and 2 (*see above*), show that MyMathLab has helped students learn and succeed in math.

University of Missouri–Columbia:

- The percent increase in the average homework grade between fall 2003 and fall 2004: **43%**
- The percent decrease of D/F grades in college algebra between fall 2003 and fall 2004: **49%**
- The percent decrease of D/F grades in intermediate algebra between fall 2003 and fall 2004: **30.2%**

University of Wisconsin–Stout:

- The percent increase in the pass rate in beginning algebra: **18%**
- The percent increase in the pass rate in intermediate algebra: **12%**
- More than **95 percent** of all MML students enrolled in beginning and intermediate algebra turned in **100 percent** of their daily homework assignments. The average score on those assignments was more than **95 percent** correct.

Community college in the Chicago area:

- The percent increase of pass rates after use of MML: **87%**

Favorable Student Feedback

Students don't just learn more math with MML; they learn how to learn—and enjoy learning more. Students surveyed about MML said the following (see also Tables 3 and 4 below):

“This type of preparation has increased my preparedness for every math test that I have taken since using the program. This has pretty much been the only thing ever to help me grasp concepts in math, and I hope that you keep it for future semesters.”

—Student at University of Missouri–Columbia

“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.”

—Student at Northern Virginia Community College

“I really enjoy this class. I have been to every class, and I have worked outside the classroom. I truly feel like I am teaching myself a lot.”

—Student at University of Toledo

MyMathLab is the best thing that has happened in the 46 years I've been teaching math. For the first time, students are coming to class wanting to learn.

—Sue Kyriazopoulos
DeVry University, Chicago

“I felt I received more help online than I would have in a classroom.”

—Student at Ivy Tech State College

“[What I like best about MyMathLab are] the guided solutions for the tracked tutorial exercises. It was extremely helpful not to be given just the solution but to have the process and methodology explained.”

—Student at Fayetteville Technical Community College

“All the information I needed was accessible from both work and home—without the need to carry books.”

—Student at Citrus College

Table 3. Student Survey Results

Percentage of students in a fall 2004/spring 2005 national survey who responded that MyMathLab helped them learn mathematics better

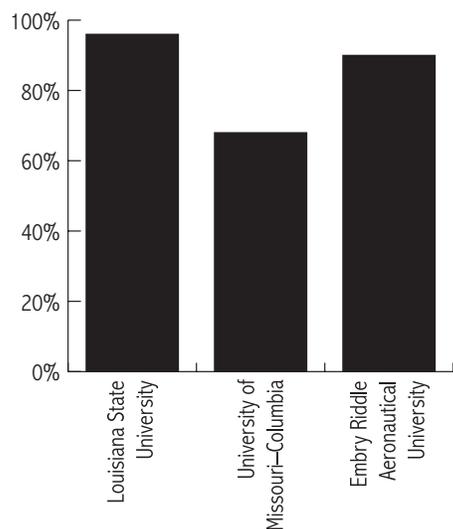
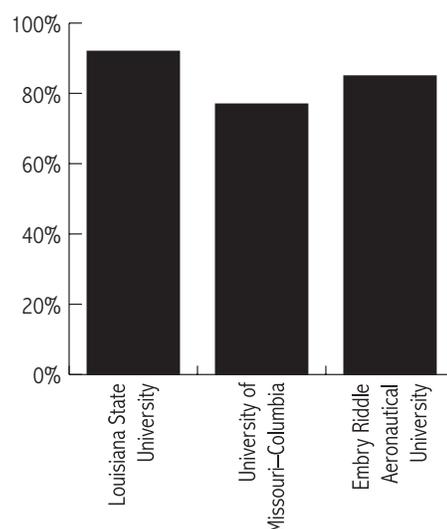


Table 4. Student Survey Results

Percentage of students in a fall 2004/spring 2005 national survey who responded that given a choice, they would choose a course with MyMathLab/recommend that faculty continue to use MyMathLab



Case Studies

For the purposes of this paper, we interviewed six instructors from six higher education institutions around the country: two community colleges, one nationally known business school, and three public universities. Each institution currently uses MyMathLab in a manner deemed most suitable to the institution and its students. One is using only the MML homework option, another uses MML as the sole teaching tool in both its online and on-campus courses, and one has integrated MML into a comprehensive teaching and learning redesign project. Others are offering MML as a student option in hybrid formats of lectures and online content.

The initial reasons for purchasing MyMathLab differ among institutions. Many were interested in the possibility of cost reductions; others hoped to improve the quality of learning—such as by boosting pass rates and increasing retention. One institution needed help managing class sizes that had grown beyond capacity; still another sought a vehicle for online course delivery.

What all of the institutions we interviewed have in common is a team of dedicated teachers—people who care and who are willing to put in the time and energy to ensure that their students succeed—not just in math but also in learning. All of the teachers using MyMathLab agree that it has helped them do just that. As Phoebe Rouse, Precalculus Mathematics Coordinator at Louisiana State University–Baton Rouge says, “No matter what the reason [for implementation] or how you redesign, if you use the software, you will arrive at the same successful place.”

Delaware Technical & Community College

In spring 2001 Delaware Technical & Community College needed an online Math 100-level course created in ten weeks. Instructor Darlene Winnington made it happen—by using MyMathLab. Today, the college and its administration are so pleased with MML, the product has since evolved from use strictly in online courses

For the first time, I'm seeing my students take responsibility for their own learning.

—Darlene Winnington
Delaware Technical & Community College

to use in the institution's campus-based, basic math course, which has a lecture/lab setting.

Instructors can now spend less time on administrative tasks and more time focusing on student needs. Students welcome the option of using resources outside of class. They appreciate the extra help and flexibility that a Web-based format affords. One important benefit is the instantaneous feedback that MML provides. Students who get a problem wrong are offered a resource that can help them find out why, redo it, and get it right. This keeps students from quitting. “For the first time, I'm seeing my students take responsibility for their own learning,” says Winnington. “They're learning how to learn.”

Winnington also reports that with MyMathLab, participation in class has increased, homework completion has increased, and pass rates have skyrocketed. Her first semester using MML in Basic Math resulted in a pass rate of 84 percent—up from 40 percent the semester before without MML. She couldn't be more satisfied. This fall, she's offering another lecture/lab format with MML, noting with pleasure, “*The students asked for it.*”

DeVry University

Faculty throughout the DeVry University system noticed a pattern: one-third of students in lower-level

mathematics courses came ready to learn, one-third came in body only, and the remaining third demanded the bulk of instructor attention. The top students got bored, and the bottom students dropped out. In 2003, after a lengthy process of proposals and approvals, research and interviews, DeVry University—one of the largest degree-granting higher education systems in North America—made a change. Today, every

The student puts in an answer and knows immediately whether or not it's right. It's a key selling point for students. Once they experience that, they buy into it.

—Steve Dorfman
DeVry University

DeVry student receives the mathematics instruction he or she needs at a pace appropriate for that student—via MyMathLab.

DeVry uses MML as its exclusive teaching tool in both its on-site and online courses. Based on student progress tracked by MML, some courses also incorporate mini-lectures—20 minutes or so devoted to topics that are giving the majority of students trouble.

DeVry's initial objective concerning MML was to improve retention. Exit interviews indicated that 70 percent of the students who left did so because of mathematics failures. As of the writing of this report, DeVry didn't have full data in terms of that objective. What the school does know is that it has seen an overall 65 percent increase in As and Bs in the first half of this semester. And a whopping 100 percent increase of As and Bs in college algebra.

"The best student feature is the immediate feedback," says DeVry's National Mathematics Curriculum Manager, Steve Dorfman. "The student puts in an answer and knows immediately whether or not it's right. It's a key selling point for students. Once they experience that, they buy into it." Dorfman estimates a success rate of 85–90 percent for DeVry students who use

MML beyond an initial three-week introductory period.

"The faculty is an important element of the success or failure of an MML course," Dorfman says. "It's a big change for the faculty. You are no longer the sage on the stage; you're the guide on the side. And many instructors have problems with that. Conversely, at locations with significantly better results than others, you can point to the instructors and see why. They're a critical piece of the program. At DeVry, we constantly reevaluate, train, and bring in appropriate teachers."

By working closely with Pearson Education, DeVry University has merged the concept of mastery learning with technology and come up with a unique product that takes the best of both and offers results not attainable any other way.* They're pleased both with their results and with their relationship with Pearson. "We work as partners," says Dorfman. "When we offer feedback or ask for adaptations in the program, Pearson hears us and makes it happen. This kind of relationship helps improve the product and creates a three-way win-win—for DeVry, for Pearson, and most important, for the students."

* *In Mastery Learning, the grading options are A, B, and F. The goal of the concept is to eliminate the possibility of a student moving to the next level of a course without a solid foundation of knowledge. Students are required to achieve an average of at least 80 on both tests and homework.*

Louisiana State University—Baton Rouge

Louisiana State University's (LSU's) college algebra, trigonometry, and precalculus pass rates were the envy of other universities. With its small class sizes and its

The Faculty Advocate program is invaluable. It's a great resource.

—Phoebe Rouse
Louisiana State University—Baton Rouge

large corps of instructors, the university was able to enjoy a high rate of academic success with an enrollment of more than 6,000 students. From an educational perspective, LSU was doing well, but heavy reliance on high-level personnel meant soaring costs. In October 2003, the administration asked the mathematics department to reduce its number of instructors from 40 to 18—while retaining the same number of students and maintaining the same quality of education.

In order to fill the gap left by this drastic cut in personnel, LSU began investigating software that would incorporate both tutorial and testing features. By providing both of those critical features, MyMathLab was able to help LSU reduce the cost of instruction while maintaining the same level of learning.

Students at LSU have embraced the MML software. With MML's focus on the learner, students who use MML learn at their own pace. They are guided through the learning process and are therefore able to keep working at skills until they are mastered. Accessible from any Web-based computer, MML offers the flexibility to do homework at students' convenience—which increases the odds that they'll do the work. And because the software content is developed in close consultation with mathematics instructors, MML responds as a classroom teacher would: students are prompted through exercises, they're stimulated, and they're rewarded for their mastery of concepts.

In fall 2005, LSU opened a 114-seat, 3,000-square-foot math lab on campus in a historic building. Funding to renovate the building and offer technical support was provided by the university, and math department personnel themselves applied for—and received—grants to buy the furniture and computers. After several pilot tests, today 3,000 LSU students are using MyMathLab both inside and outside the new lab, and a second lab is being planned for the near future to accommodate even more students.

“MyMathLab software is good,” says Phoebe Rouse. “But like any other software, it takes time to master. That's why the Faculty Advocate program is invaluable. It's a great resource.”

What has Rouse learned from her experience with MML? *Students who attend 70 percent or more of the classes and put in 70 percent or more of the required lab*

hours have a 95 percent chance of getting an A, B, or C in the course. It is participation in the program that is the ultimate indicator of student success—something that students can control. MML promotes active learning among students. Students learn to better manage their time. Rouse and her colleagues consider this kind of empowerment an important indicator of long-term success—and so does the university's administrative staff.

Montgomery College, Conroe, Texas

In 2003, faculty at Montgomery College in Conroe, Texas (MC), weren't satisfied with student pass rates. In an effort to improve those rates, they sought student- and instructor-friendly courseware with authoring flexibility and a high level of customer service. It was a tall order. The school researched the options—and it purchased MyMathLab.

Everyone is accountable and knows what they need to do.

—Maureen Loiacano
Montgomery College, Conroe, Texas

The built-in flexibility of MyMathLab courseware enables the faculty at MC to tailor developmental math assessments and courses for copying and standardization throughout the college. In addition, MML saves instructors valuable time by facilitating scores of required outcome assessments.

But the most-talked-about MML component at MC is MML's customer service. “This is a number one priority for us,” says Maureen Loiacano, Math and Education Department Chair. “[MML customer service representatives] are incredibly responsive. Every call we make reaches a live person. Any problems are immediately resolved. Our day-to-day support questions and our long-range developmental requests are heard—and heeded. It's customer service of the highest quality.”

In any given semester, all 2,400 of MC's developmental math students are using MML. All have adapted to the nontraditional format. Loiacano attributes this to comprehensive faculty training: first by the staff at Pearson and now by MC's own department trainers. "The instructors are confident, adaptable leaders," she says. "They feel good about the software, and the students pick up on that."

Spring 2005 pass rates among students using MML were significantly higher in college algebra—18 percent higher—than those of the previous semester, in which MML had not been used. The jump from 55 percent to 73 percent has Loiacano, the rest of the faculty at MC, and the students eager for more.

*Every call we make reaches a live person.
Any problems are immediately resolved.
It's customer service of the highest quality.*

—Maureen Loicano
Montgomery College, Conroe, Texas

Students are motivated by the guided solutions, by the ability to immediately see what they did wrong. Students are taking responsibility for and ownership of their learning. Students' conversations have turned from weekend activities to study tips. Math labs are crowded at the beginning of the semester, not just at test time. Students know what works for them—in a spring 2005 survey, an overwhelming 75 percent said that MML helped them improve their grade.

MC has attained a new level of communication between faculty and students and between faculty and trainers. "Everyone is accountable and knows what they need to do," says Loiacano. "Students are learning. They're happy. We love it!"

University of Alabama

The University of Alabama (UA) Department of Mathematics currently teaches approximately 3,500

Many students are requesting that the MML format be applied to even higher level courses, recognizing that this is the most productive—and enjoyable—way for them to learn.

—Joe Benson
University of Alabama

precalculus students—all with MyMathLab. An early adopter of learning software, UA was delivering precalculus classes with MML as early as January 2001, and it had full implementation in intermediate algebra by fall 2001. Today, the university uses MML across a full spectrum of formats, and for most of its precalculus courses. The school couldn't be more pleased.

Unlike many institutions, UA wasn't forced into alternative teaching and learning formats by a need to reduce costs or contain large-enrollment courses. UA simply wasn't experiencing the success with traditional formats that it wanted. The school wanted more for its students: more learning, more retention, and more opportunity to succeed.

The initial transition from a traditional lecture-based format to the student-centered Web format was a challenge for some students, but the discomfort seemed to dissipate after only one or two semesters. Today, UA students wouldn't have their courses any other way.

Pass rates of 40–45 percent are a thing of the past at UA. Now, success rates regularly register in the 70–75 percent range. However, Joe Benson, Senior Associate Dean in the College of Arts and Sciences, sees MML as a means for ensuring more than just higher grades. "MML offers the challenge of self-discipline," he says. "Students are learning to take on more responsibility. Assessments indicate that students like the freedom to work when they want to. Frequently, freshman need prodding, but they soon realize that if they do the work, they will be successful."

Visitors to UA's 240-computer Math Technology Learning Center expect to see a hubbub of activity.

What they end up seeing is more surprising. “Students are doing math,” Benson says. “They have pencils and paper, and they’re working. In our lab, the computer is for introduction to concepts and for getting help.

By doing the actual math on their own, our students are having a deeper learning experience and they are better equipped for upper-level courses. In fact, many students are requesting that the MML format be applied to even-higher-level courses, recognizing that this is the most productive—and enjoyable—way for them to learn.”

A boon to the whole department, the cost savings associated with MML have allowed the department to reduce course sizes and to offer additional support where needed. “However,” says Benson, “the decision to use MML was based on helping students learn math better, to be more successful. If it didn’t work, we’d go back to a traditional format—financial benefit or not. The bottom line is simple: *Students learn math by doing math. And MML enables students to do math.*”

University of Idaho

At the University of Idaho (UI), MyMathLab is used exclusively for homework in hybrid courses that require students to attend classes once a week and labs three times a week. Students have the choice of completing homework assignments from a textbook or by using MyMathLab, in which course work can be done from anywhere, since all of the material, including content lectures, can be accessed online.

A quick look at pass rates for Kirk Trigsted’s intermediate algebra (Math 108) course offers a compelling picture. The following includes all students in fall 2004 in Math 108 who finished the course, meaning, students who took the final exam.

- Overall pass rate: 77 percent
- Students who chose the MyMathLab option for homework (457 of 491): 93 percent
- Pass rate among students who chose the homework from the book: 62 percent
- Pass rate among students who chose the MML option for homework: 78 percent

“So far, it seems that the students who choose the MML option comprehend the material better than

the students who do the textbook homework,” says Trigsted. “Last semester, students who chose the MML option scored, on average, 13.5 points higher on the final exam than their textbook option counterparts.”

Trigsted suspects that a large component of the point difference is the immediate feedback students receive from MML. Students know in an instant whether they understand the material, and if not, they can redo a problem until they get it right. He sees students doing better and enjoying math more.

Still, MML isn’t a magic bullet. Trigsted and his colleagues have had to fight for the necessary physical space and computer equipment. Despite the measurable benefits UI students gain from computer access, Trigsted is still juggling 1,500 students on 84 desktop computers. Not one to be deterred, Trigsted has created rolling deadlines to spread out lab use, and he is supplementing the lab with a laptop checkout program.

I can spend less time grading and more time helping students.

—Kirk Trigsted
University of Idaho

Hopes are high that as the financial benefits of using MML get recognized, more funds will be allocated to the lab. After all, every semester in which MML is used, the university saves money in both instructor salaries and classroom space. The instructors are able to teach more classes per year, since now they are scheduled to teach only once a week. They can take on more at less cost, and they can shift tutorial costs to less expensive undergrads. Since the majority of learning time takes place online, class space is freed up, and the department is using a third of the space it used to.

Conclusion

Since 2001, approximately 1 million students have achieved greater success in math with the help of MyMathLab's revolutionary format for teaching and learning. Users testify to MyMathLab's dependable and easy-to-use online homework, guided solutions, multimedia, tests, and e-books that put the focus where it needs to be: on the student. MyMathLab's emphasis on self-motivation, positive reinforcement, and personal accountability means that MyMathLab teaches students more than just math. It empowers them to succeed.

The institutions interviewed for this paper came to MyMathLab for a variety of reasons, ranging from cutbacks to disappointing pass rates. Some implement the full range of MyMathLab features; others use it only for homework. No matter what the reason for using MyMathLab or the level of use, all are realizing success.

For those in the industry, MyMathLab's impact comes as little surprise. In her seminal 2000 monograph entitled *Innovations in Online Learning: Moving Beyond No Significant Difference*, Carol Twigg, President of the National Center for Academic Transformation, outlined five key features that contribute to both the quality of student learning and substantial cost reduction. Those familiar with MyMathLab recognize those five concepts as the essential building blocks of the program.

1. An initial assessment of each student's knowledge/skill level and preferred learning style
2. An array of high-quality, interactive learning materials and activities
3. Individualized study plans
4. Built-in, continuous assessment to provide instantaneous feedback
5. Appropriate, varied kinds of human interaction when needed

The response to MyMathLab is unanimous. "I'm sold," says Jill Shirley, an instructor at California State Polytechnic University, Pomona. "And so are the students.

It's so easy to set up and manage a MyMathLab course Web site for an Internet math course. I won't use any other package to run my online math classes.

—O. Pauline Chow
Harrisburg Area Community College

My exam averages and course pass rates are up. Students are actively engaged in practicing math, they ask more and better questions, and they seem to be enjoying the learning process more than ever. They appreciate the instant feedback, and they aren't satisfied until they score 100 percent on homework assignments. When it comes time to register for the next class, most students who have done taken lecture-based and MyMathLab hybrid classes seek out the MyMathLab sections. They feel a sense of accomplishment because they recognize and take credit for the role they've played in their own success."

To naysayers who still cling to the past, this 1977 quote by Ken Olsen, President, Chairman, and Founder of Digital Equipment Corp., best expresses the need to rethink our assumptions about delivering higher education: "There is no reason anyone would want a computer in their home." For those who are ready to think creatively, Pearson Education is ready to provide the training, the support, and now the broadest range of titles—when and where they are needed.

For more information, visit MyMathLab online at www.mymathlab.com.

*For more information about schools using MyMathLab,
visit www.thencat.org/R2R/R2R_ProjDiscipline.htm.*



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