LIBERTY UNIVERSITY — Lynchburg, VA

Product Name MyLabsPlus

Course Name Fundamentals of Mathematics and Intermediate Algebra

Course Format Emporium: both open and scheduled lab; flexible pacing

Key Results After redesigning its developmental math sequence from traditional, face-to-face courses to an emporium model using MyLabsPlus and requiring topic mastery and scheduled lab hours, Liberty University saw ABC rates increase by as much as 22 percent.

Submitted by
Kathy Spradlin, Coordinator of Math Emporium and Developmental Math

Course materials
MyLabsPlus and *Developmental Mathematics* (custom for Liberty University), Squires and Wyrick

Setting

Liberty University, founded in 1971, is the largest private, non-profit university in the nation, the largest university in Virginia, and the largest Christian university in the world. Located near the Blue Ridge Mountains on more than 7,000 acres in Lynchburg, Virginia, Liberty offers more than 450 unique programs of study from the associate to the doctoral level. More than 200 programs are offered online. Liberty's mission is to train Champions for Christ with the values, knowledge, and skills essential for impacting tomorrow's world.

Challenges and Goals

Liberty University began using technology in their math courses in 2004 but had never used MyMathLab. Due to limitations with their program, they had to evaluate new options to accommodate their emporium redesign. MyLabsPlus was selected as a "superior product" for implementing their new format. After initial implementation, the department made adjustments to the program to improve course outcomes. They hypothesized that allowing late work to be turned in, with a penalty, and requiring lab hours would improve student performance.

Implementation

MyLabsPlus was implemented in spring 2012 in all sections of Fundamentals of Mathematics and Intermediate Algebra. Students spend one hour each week in a lecture format class and at least three additional hours in the Math Emporium, a computer lab with 250 computers that is open about 75 hours per week. In spring 2012, students could choose when to work in the lab. In fall 2012, the school began to schedule a portion of the required lab hours. Tutors and faculty are available in the math lab for personalized instruction, assistance with homework, and review of quizzes and tests.

MyLabsPlus is used to create and complete homework assignments, quizzes, proctored tests, and the final exam. In addition, it is used as a platform to deliver instruction, making use of the video lessons included with the textbook and additional custom videos uploaded by the instructors. Questions on all assignments are drawn from MyMathLab's bank of problems or created using MyMathLab's custom exercise builder. Personalized assignments are created using the option to omit questions from objectives that were mastered on a previous assignment. Students are encouraged to use the Gradebook to review what they have missed on their quizzes before making additional attempts.

Students may complete MyMathLab homework from any location. They have unlimited attempts to achieve at least 80 percent mastery, and all learning aids are available. Homework can be completed after the due date; however, a five percent penalty is applied by MyLabsPlus.

Students take 11 quizzes, one at the end of each unit. They have three attempts to achieve 80 percent mastery. The highest score counts toward the course grade. Students who do not achieve mastery are required to meet with a tutor to review their quizzes before another attempt is granted. A homework grade may be deleted when a student is required to redo an assignment.

Students take three proctored tests and a final exam in the Math Emporium using MyLabsPlus. Tests have passwords and time limits. If students don't achieve at least 70 percent on a test, they must complete a personalized homework assignment based on that test (meeting the 70 percent mastery) before a second attempt at the test is open to them. If they are unable

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to reach 70 percent on their second attempt, the student must meet with their instructor to discuss strategies to improve their mastery.

The developmental math courses are flexibly paced, meaning that students who do not complete the course in one semester can start the following semester with the unit after the last test they passed, instead of starting at the beginning. In addition, students are allowed to work faster than the schedule and complete the course early. Fundamentals of Mathematics students who complete the course in less than eight weeks may start Intermediate Algebra during the same semester. Students who complete Intermediate Algebra in less than four weeks can start their next course in Liberal Arts Math or Statistics.

Assessments

Fundamentals of Mathematics

45.0 percent	MyLabsPlus tests (three, proctored, timed, password protected)
19.4 percent	MyLabsPlus final exam (proctored, timed, password protected)
15.3 percent	MyLabsPlus homework (unlimited attempts, 80 percent mastery required)
11.0 percent	MyLabsPlus quizzes (three attempts, 80 percent mastery required)
9.3 percent	Participation

Intermediate Algebra

49.5 percent	MyLabsPlus tests (proctored, timed, password protected)
20.7 percent	MyLabsPlus final exam (proctored, timed, password protected)
14.1 percent	MyLabsPlus homework (unlimited attempts, 80 percent mastery required)
7.7 percent	MyLabsPlus quizzes (three attempts, 80 percent mastery required)
8.0 percent	Participation

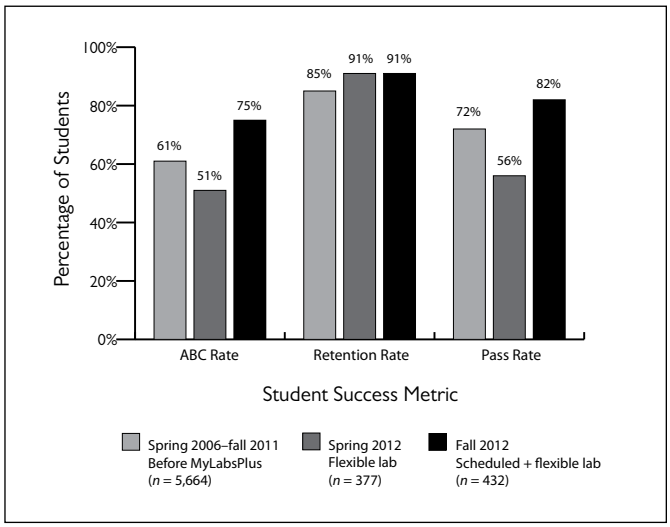

Figure 1. Student Success Rates in Fundamentals of Math before and after MyLabsPlus Implementation, Spring 2006–Fall 2012

Results and Data

The fall 2012 ABC rates increased by 14 percentage points (22 percent) in Fundamentals of Math and nine percentage points (14.7 percent) in Intermediate Algebra, compared with average ABC rates prior to MyLabsPlus usage (Figures 1 and 2). In addition, pass rates based on the number of students completing the course rose 10 percentage points (13.3 percent) in Fundamentals of Math and 12 percentage points (15.7 percent) in Intermediate Algebra, compared to pass rates in the 12 semesters prior to MyLabsPlus usage. Success was not achieved without effort, however.

The first semester MyLabsPlus was used, completion rates fell below 60 percent. At that time, mastery requirements applied to homework and quizzes only, and the course had firm deadlines. The department found that many students were not managing their time well and were doing assignments late or not at all, thereby preventing them from opening the unit quiz and, ultimately, making them ill prepared for their test. As a result, the department made some modifications to their redesign:

- Students can complete assignments after due dates with penalties.

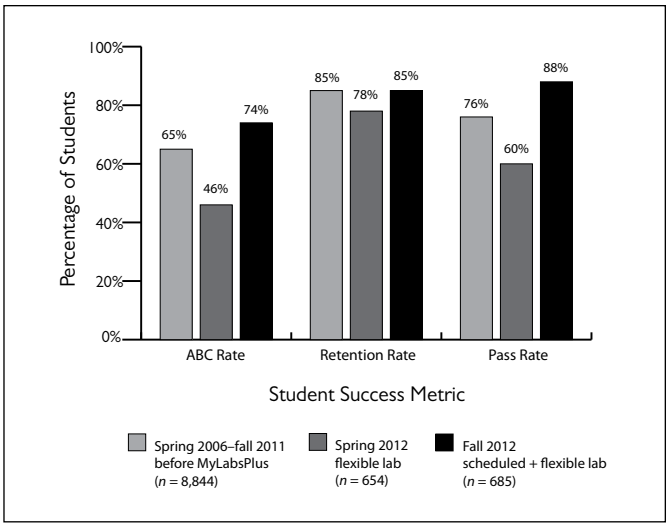

Figure 2. Student Success Rates in Intermediate Algebra before and after MyLabsPlus Implementation, Spring 2006–Fall 2012

- Mastery requirements are strictly enforced.
- Some Emporium hours are scheduled to help students manage their time.

In the fall of 2012, the developmental math coordinator, who manages the delivery of course objectives across 50 sections per semester, began to retrieve course data using the Advanced Export feature in MyLabsPlus. An Excel spreadsheet is used to analyze the following: grades by instructor, grades by days of the week, mean test score, mean course grade, number enrolled, number who had not taken the test, and average time spent on the test.

According to Kathy Spradlin, developmental math coordinator, analysis of the data concludes that a student's grade does not depend on the day of the week his class meets or his instructor, but it does suggest that students may not spend sufficient time on tests. Evaluation of course data has allowed for ongoing adjustments and improvements. Faculty took note of how many students across all sections had not taken a test on time, and planned interventions to help students work harder and smarter. In addition, armed with data showing which topics took students more time to learn, some lessons have been reorganized and others more thoroughly covered in class.

The Student Experience

Intervention strategies

The department utilizes the "email by criteria" option in MyMathLab to communicate with students who are not completing assignments in a timely manner. In addition, faculty meets with the students and refers them to the university's retention coordinator when necessary. The department also requires each student to complete every assignment with 80 percent mastery before moving on, plus offers one-on-one tutoring. One student reports success as follows:

- "Math is the one subject that I have always been poor at. The way MyLabsPlus was structured pushed me to do my very best and to master each subject. The Help Me Solve This option for each problem is what I have needed throughout all of the math courses that I have taken in my life. I need to be shown step-by-step how to solve each problem that I had. Once I was able to see and work through each step, I could click 'Similar Exercise' and do the problem myself successfully."

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–Student

Increased communication and collaboration

Prior to implementing the emporium model, communication between instructors and students primarily comprised the instructor speaking to the entire class and to the few students who sought help during office hours. In the MyLabsPlus courses, there is increased communication with individual students as instructors provide personalized instruction and review the results of quizzes and tests. Peer tutors assist students with homework problems and explain concepts. Student comments reflect their preference for the new program's flexibility and individualized instruction:

- "I like that we don't have to sit in a classroom three days a week working at the same pace as everyone else, but that we can work as far ahead as we want. The opportunity to be able to finish before the end of the semester is a nice change."

- "I enjoy that if I know the material I can advance, and if I am struggling with a particular area I can spend a little more time on it and not worry about the rest of the class moving on."
- "Having instructors in the Emporium available when the computer-guided material lost me was excellent."

Student learning strategies

Having unlimited attempts on homework assignments allows students as much practice as they need to master a concept. Having three attempts on each quiz, followed by a conference with a tutor (if necessary), ensures that students review the concepts that they did not master. Many students indicate an appreciation for this strategy:

- "I really love that everything was done by computer. I have never done that kind of thing before, and math is my worst subject, but for some reason I loved this class. It made learning math so much easier for me."
- "I like that I can retry a problem over and over if I miss it the first time.

Conclusion

Overall, Spradlin reports that students are spending more time doing math and less time watching someone else do math. She believes that because mastery is required, students are getting a solid foundation in all concepts; whereas, in traditional courses, a student could pass with high grades on a few chapters and failing grades on others. The department plans to begin offering unit pretests to help students who know the material move ahead more quickly.

Spradlin says she would suggest MyLabsPlus to a colleague with the warning that merely adding computer homework onto traditional instruction is not the best use of an online learning system. "The course should be redesigned with a balance of online learning and human interaction."

Implementation and results case studies share actual implementation practices and evaluate possible relationships between program implementation and student performance. The findings are not meant to imply causality or generalizability within or beyond these instances. Rather, they can begin to provide informed considerations for implementation and adaptation decisions in other user contexts. For this case study, mixed-methods designs were applied, and the data collected included qualitative data from interviews, quantitative program usage analytics, and performance data. Open-ended interviews were used to guide data collection.