

MyLab Economics educator study examines Learning Catalytics and exam scores at Normandale Community College

<p>School Name Normandale Community College, Bloomington, MN</p> <p>Course name Principles of Microeconomics</p> <p>Course format Flipped, hybrid</p> <p>Course materials MyLab Economics and Learning Catalytics with <i>Microeconomics</i> by Hubbard and O'Brien</p>	<p>Timeframe Spring 2017</p> <p>Submitted by Brooks Herrboldt, Instructor</p> <p>Results reported by Candace Cooney, Customer Outcomes Analytics Manager</p>
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Key Findings

- Students showing mastery of course content by earning an A, B, or C as the final course grade had average MyLab quiz scores 21 percentage points higher than students who earned a D or F.
- Students with above average Learning Catalytics/problem set scores earned substantially higher MyLab quiz and exam scores than students who scored below average on Learning Catalytics/problem set assignments.
- 96 percent of respondents on an end-of-semester survey agreed that the in-class Learning Catalytics questions helped them identify lecture material that they may not have understood completely.

Setting

- Locale: large, urban, public, two-year community college located south of Minneapolis
- Enrollment: more than 14,000 credit students
- Full-time students: 42 percent
- Full-time student retention rate: 55 percent
- First-time, full-time students: 17 percent
- Three-year graduation rate: 16 percent
- Faculty-student ratio: 25:1
- Age: 26 percent of credit students are 25 or older
- Gender: 55 percent of credit students are female

- Diversity: 38 percent of credit students are students of color

About the Course

Brooks Herrboldt has been teaching for approximately 14 years, spending the last 12 years at Normandale, where he has been teaching Micro- and Macroeconomics. Principles of Microeconomics is a one-semester, three-credit course which enrolls about 1,100 students per year. Face-to-face sections seat approximately 45 students. The course is required of business and economics students and is also a general education requirement for students in political science and history. Principles of Microeconomics is a companion course with Principles of Macroeconomics, and together the courses introduce students to the economic way of thinking.

The course covers theories of how various types of product and resource markets operate and the implications for public policy that result. Also covered is decision making by consumers, business firms, and government; price determination, resource allocation, and income determination via markets.

Upon successful completion of this course, students will be able to:

- Explain the implications of scarcity for society and decision-making;
- Apply the model of supply and demand to analyze market behavior;
- Apply the concepts of marginal analysis to optimize behavior;
- Determine the opportunity cost of a particular choice; and
- Define economic efficiency, and explain why efficiency is an important economic goal.

Challenges and Goals

About ten years ago, Normandale began offering economics courses online. Recognizing that publishers use their vast resources and textbook content to provide engaging, interactive tools that promote personal responsibility for learning, Herrboldt adopted MyLab™ Economics in 2007 for all of his sections of Economics in all course formats.

In 2016, Herrboldt resolved to enhance his current hybrid sections by [flipping the classroom](#). He saw this form of blended learning as a good fit for the reduced seat time lecture he was offering. It required that his students learn at least some course content via online learning features and multimedia assignments on their own, allowing lecture to focus on problem solving and small-group interactions. To facilitate the flipped class, Herrboldt chose to adopt [Learning Catalytics™](#), embedded in the MyLab program, which is an interactive student response tool that encourages team-based learning by using smartphones, tablets, or laptops to engage students through interactive tasks and analytical thinking. For Fall 2016 classes, students were required to use both MyLab and Learning Catalytics.

Implementation

Learning Management Integration System

[Pearson's Learning Management System \(LMS\) integration service](#) gives students and instructors easy access to MyLab from their existing school LMS. Herrboldt chose to integrate his MyLab course with Desire2Learn (D2L) for the following reasons:

- Single sign-in process: students are ready to work in MyLab on the first day of class; and

- Content linking: ability to link to MyLab directly from D2L.

Herrboldt's students have just one access code and a single sign-on process instead of the need to log in to D2L and additionally sign in to MyLab. This results in a simple way for students to start their MyLab assignments, ensuring that they are ready to work from the first day of class. On a voluntary, end-of-semester survey (59 percent response rate) in Spring 2017:

- 93 percent of students strongly agreed or agreed that they were able to access MyLab through D2L and appreciated not having a separate, second log in and password for MyLab.

MyLab Economics

MyLab Economics is required; the program is used by students working at home for understanding content, homework assignments, and assessments. As the course instructor, Herrboldt's role is to assign content and homework in MyLab and provide remote support to students using the program at home. He anticipates that students will spend approximately 2–3 hours per week working in MyLab, and students confirmed this on the end-of-semester survey—51 percent of students said they spent 2–3 hours per week working in MyLab Economics, while an additional 22 percent of students said they spent more than three hours working in the program.

Herrboldt's course uses an active learning approach, where most conceptual understanding of the course content happens in the class, with students responsible for out-of-class activities that provide an overview of the concepts. Prior to class, students are required to view the narrated and annotated PowerPoint slides that Herrboldt created for lecture and read the appropriate textbook content. The lecture slides are available on Saturday of each week. This critical strategy for flipping the class has proven successful for Herrboldt—95 percent of respondents on the end-of-semester survey agreed that reading the textbook and viewing the annotated PowerPoint slides prior to attending lecture prepared them for the in-class activities and discussions. Lecture is then a combination of group problem solving and lecture reinforcement.

Learning Catalytics

Learning Catalytics (LC), a bring-your-own-device personal response system, complements lecture instruction by using real-time questions and answers to capture student feedback to quantitative and graphical problems. A range of data is captured, allowing Herrboldt to assess student understanding instantly. This immediate feedback enables him to adjust his lecture based on his students' responses, identifying topics where they are struggling. To begin the process, class begins with a graded problem set or graphing application to ascertain if students have completed the out-of-class assignments. Although Pearson provides a pool of Learning Catalytics questions, Herrboldt has written his own, mirroring what is covered in his PowerPoints and later in lecture. Students work in pairs or in small groups on school iPads that Herrboldt has reserved for the semester, each group using one iPad. The small group setting obligates students to work together, when they might otherwise choose to respond individually. This peer-to-peer learning facilitates teamwork and promotes a setting where support and cooperation are valued, teaching students worthwhile life-long skills that are important in the professional workplace. Students develop collaborative skills and work together to pool their knowledge and skills. One student summed this up on the student survey, "[Learning Catalytics] allows students to work in groups and create new relationships while building communication skills."

Learning Catalytic/problem set (LC/PS) grades are a combination of attendance, participation, and accuracy of response. Students receive one point for attendance, two points for attempting the question, and three points for answering it correctly. The two lowest scores are dropped before the final LC/PS score is recorded in the grade book.

Students participating in the end-of-semester survey shared the following about their use of Learning Catalytics:

- 91 percent of students strongly agreed or agreed that working in a group to answer Learning Catalytics questions was a good way for them to learn from other students.
- 89 percent of students strongly agreed or agreed that Learning Catalytics made lecture more interactive and helped them focus on the material being covered.
- 93 percent of students strongly agreed or agreed that they would recommend their instructor continue to use Learning Catalytics in this course.

Students also commented about their Learning Catalytics experience:

- *"It engages students actively through content-based questions that are then explained, giving a deeper understanding than a lecture."*
- *"This was an excellent system! I really loved being able to work with my fellow students. I think that this program and classroom format greatly improved my grade."*
- *"Learning Catalytics helps classmates learn from one another and ask questions. Seeing other people's answers and figuring out why they were wrong [was a benefit of Learning Catalytics]."*
- *"I gained a much deeper understanding of the topics taught throughout the course. If there was an incorrect answer, our professor would explain the correct answer as well as explain why the incorrect answers were wrong."*

MyLab Economics

In order to help his students understand economics, Herrboldt assigns problem sets in MyLab as weekly homework for skills practice and applying the textbook material. There are no points associated with these assignments, but students are required to complete the homework problems with a minimum score of 70 percent before the MyLab quiz will open. Students have unlimited attempts on homework problems, given that practice is the ultimate goal. On the end-of-semester survey, 100 percent of students said they appreciated having unlimited attempts on MyLab homework assignments to help prepare for the MyLab quizzes. One student summed up the comments of many, noting, "A benefit of the MyLab was the multiple tries on homework, to make sure I understood things correctly."

Learning aids are turned on during these homework assignments to provide just-in-time support as students practice newly acquired skills. On the end-of-semester survey, 51 percent of students said they usually or always use the learning aids when unable to start or complete a homework problem in MyLab, and an additional 31 percent indicate they sometimes use the aids. In particular, students on the survey commented on the Help Me Solve This tool:

- *"When not knowing an answer on homework or not knowing how to do a problem, the Help Me Solve This option really helped me understand it."*
- *"I liked having the Help Me Solve This option, I am a person who learns better when being shown step-by-step."*

Herrboldt assigns a ten-point quiz weekly in MyLab, and students have three attempts at completion with no time limit. The highest quiz score is recorded in the gradebook, and the two lowest quiz scores are dropped for final score calculation. MyLab assignments are due Sunday night at 11 p.m., and no late work is accepted for any reason.

Four exams in MyLab comprise the additional summative course assessments. Each exam consists of 33 questions and is worth 100 points. Most questions are multiple choice, but the exam may also include between three and eight questions similar to MyLab homework problems. The exams cover all course content: assigned reading, MyLab assignments, MyLab quizzes, PowerPoint presentations, MyLab problem sets, MyLab video questions, and instructor-created videos. Students have 60 minutes for completion and just one attempt per exam. No make-up exams are given, but students with a valid or prearranged exam absence are required to take a comprehensive final exam covering parts 1–3 of the course, as well as complete the fourth regularly-scheduled exam.

Assessments

- 71% MyLab exams (4)
- 18% MyLab quizzes
- 11% Learning Catalytics/problem sets

Results and Data

Figure 1 identifies that students who showed mastery of course content by earning an A, B, or C as their final course grade had average MyLab quiz scores of 81 percent, which is 21 percentage points higher than students who earned a D or F (60 percent average MyLab quiz score).

Average MyLab quiz score and student success rates

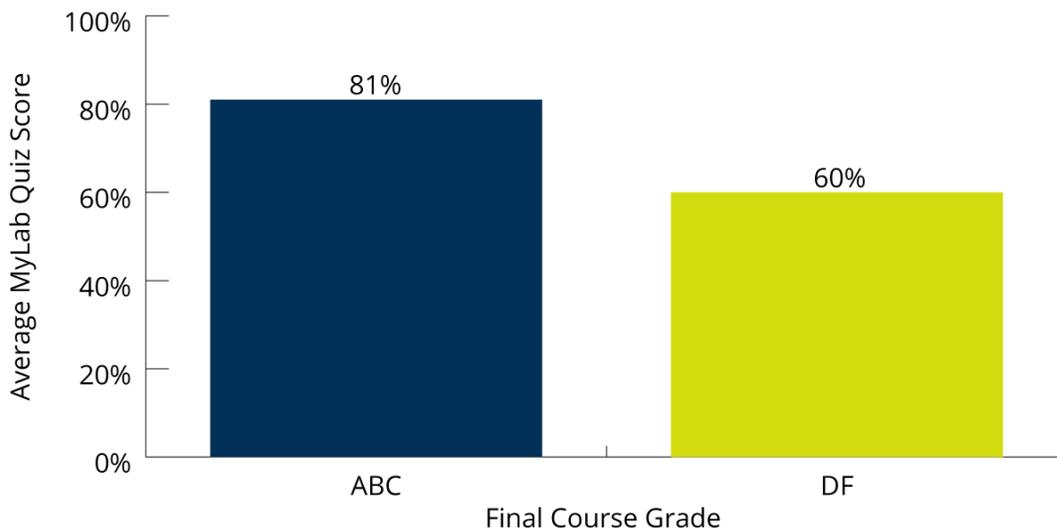


Figure 1. Average MyLab Quiz Score and Student Success Rates, Spring 2017 ($n=35$)

Students were divided into two groups based on the average Learning Catalytics/problem set score. Students who earned LC/PS scores above average earned higher average quiz and exam scores (figure 2).

- Students who scored equal to or above the average Learning Catalytics/problem set score earned average quiz scores 17 percentage points higher than students who earned an LC/PS score below the average.
- Students who scored equal to or above the average Learning Catalytics/problem set score earned average exam scores 15 percentage points higher than students who earned an LC/PS score below the average.

Learning Catalytics score and average quiz and exam scores

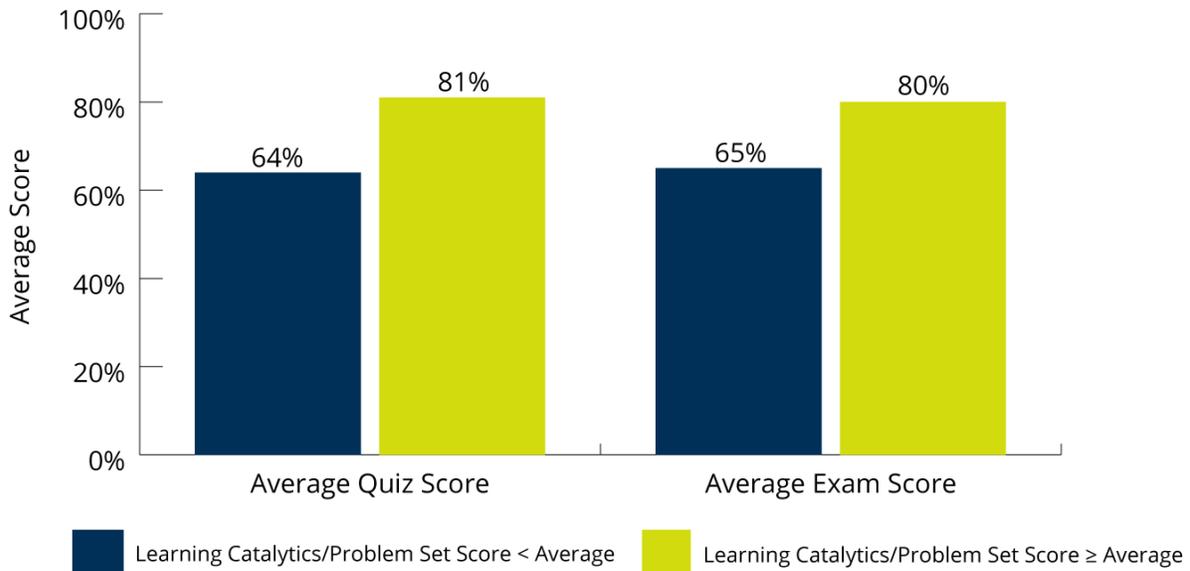


Figure 2. Average Learning Catalytics/problem Set Score and Average Quiz and Exam Score, Spring 2017 (n=35)

The Student Experience

Responses from the Spring 2017 end-of-semester, voluntary survey of Herrboldt's students indicate that the majority of responding students recognize the value of MyLab Economics.

- 100 percent of students strongly agree or agree that their understanding of the course material increased as a result of using MyLab.
- 96 percent of students strongly agree or agree that the use of MyLab positively impacted their quiz and exam scores.
- 100 percent of students strongly agree or agree that they would recommend MyLab to another student.

Student survey responses to the question, "What are the benefits of MyLab for you as a student" include:

- *"MyLab shows a wider variety of application based explanations of concepts that may otherwise be difficult to understand."*
- *"I liked how the MyLab homework explained how to do the questions step-by-step until you got the question right."*
- *"It keeps all assignments organized very well. It's easy to find information pertaining to specific questions using the eText and the instant feedback on the homework is unbelievably useful."*

- *"I could review all my homework and lessons before I took the exam. Moreover, when I did something wrong, the theory and definition pop up right away. Thus, I could understand why I was wrong."*
- *"I like the reliable resources of MyLab, which help me a lot with my homework. I like the easy access on the web, I look at it while I am on the bus!"*

Conclusion

Flipping the class meant Herrboldt had to create meaningful, interactive classroom activities that would help his students apply the course content they were working on outside of class to important economic topics. Learning Catalytics enables him to ask numerical and graphical problems that his students work on in small teams, while he monitors analytics to identify where they are struggling. With this information, Herrboldt is able to adjust his instructional strategy in real time and try additional ways of engaging his students during class. Students identified with many of the advantages of Learning Catalytics, including the teamwork and collaborative aspect of coming to consensus when answering questions. "[With Learning Catalytics], everyone gets the opportunity to discuss and answer the question, then the instructor has the opportunity to explain and talk about the problem, too," stated a student on the end-of-semester survey. Given his success to date, Herrboldt plans to continue flipping the class using Learning Catalytics in the future.