

## MyLab Economics educator study measures exam scores and final course grades at Shippensburg University

<p><b>School name</b> Shippensburg University, Shippensburg, PA</p> <p><b>Course name</b> Principles of Microeconomics</p> <p><b>Course format</b> Lecture</p> <p><b>Course materials</b> MyLab Economics with <i>Principles of Microeconomics</i> by Case, Fair, and Oster</p>	<p><b>Timeframe</b> Fall 2014–Fall 2015</p> <p><b>Educator</b> Professor Janet Koscianski, Ph.D.</p> <p><b>Results reported by</b> Candace Cooney, Pearson Customer Outcomes Analytics Manager</p>
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### Key Findings

- Data for this course show that individual exam and final course grades improved after implementation of MyLab Economics.
- Students who earned higher average MyLab homework scores also earned higher final course grades.
- 76 percent of students indicated that the active learning aspect of the MyLab Digital Interactives helped them understand the associated course material more completely.

### Setting

Shippensburg University is a medium-sized public university in rural Cumberland Valley, located in south central Pennsylvania. The university offers a wide variety of undergraduate programs along with a limited number of graduate degrees. In Fall 2015, the school served more than 7,000 students and the majority came from in-state. The average grade point average is 2.8, the average freshman retention rate is 71 percent, and the four year graduation rate is 37 percent. Approximately 16 percent of students identify as minority.

Professor Janet Koscianski has been teaching since 1990, with the last 25 years spent teaching Microeconomics at Shippensburg. Principles of Microeconomics is a one-semester, three-credit course taken by approximately 300 students per semester. It is required of all business, economics, and political science majors; the course is also taken to fulfill undergraduate students' general education credit requirements. Because the course is an option for so many disciplines, sections

always include students from every grade level, freshman to senior, and with widely varying levels of mathematical skills. The course provides an introduction to price theory, covering the theory of the firm under purely competitive and imperfectly competitive market conditions, consumer choice and budget constraints, theory of income distribution, and the theories of international trade and development. Application of the theory to practical problems is stressed. Students learn the underlying theoretical principles of market analysis and apply these principles to real world situations, using graphical analysis to help understand different market structures and the impact of government policies on the market.

## Challenges and Goals

Recognizing that success in the mastery of economics requires practice, students in Koscianski's course would complete worksheets she created to provide an additional option for problem solving and exam preparation. However, hand grading of the worksheets was not a viable option given the large enrollments in these classes and the absence of any graduate assistants to perform the grading. Furthermore, in order to receive assistance when having trouble with homework, students would have to visit one of a limited number of live economics tutors on campus, something many of her students needed to do but simply chose not to do. Koscianski was familiar with online homework programs from past use. Knowing that students today are part of a generation that embraces the use of computer-based learning tools, she decided to adopt MyLab™ Economics for Fall 2015 in an effort to give her students the support and help they needed while doing homework and practicing problems, at the moment they most required that assistance.

## Implementation

Koscianski's use of MyLab Economics is required; the program is primarily used at home on a personal computer. Students use the program for reviewing new concepts and content understanding, homework assignments, practice, and exam preparation. As the course instructor, Koscianski's role is to introduce new concepts through lecture and assign content and homework in the textbook and MyLab.

Lecture follows a familiar format in Koscianski's course:

- Review of previous chapter content and associated problems and questions, as needed
- Outline of new chapter content
- Mathematical and graphical explanations of concepts and definitions
- Application of economic content to real world examples

The role of MyLab in Koscianski's class is to help students assess their own understanding of the course material and practice with key concepts and terms from the assigned reading, as well as to track their progress. Homework assignments have firm due dates, generally to be completed by the time the chapter has been covered in lecture but before lecture starts on the subsequent chapter. Homework submitted after the due date was not penalized in Fall 2015 since it was Koscianski's first time implementing MyLab for credit in her classes. However, students did receive a zero percent if the homework was not completed at all.

Students complete one assignment per chapter; each assignment averages about 40 questions, but some chapters may have up to 60 questions if the chapter includes significant and more challenging content. The questions mainly consist of multiple choice and graphing, but each assignment also includes some algorithmic problems, true/false questions, and test bank questions.

Students are allowed unlimited attempts at the homework problems and questions for chapter one; Koscianski had observed there is usually some anxiety early in the course, especially with younger students, so she views the chapter one assignments as an opportunity for students to get familiar with the program and to create a comfortable environment for future homework submissions. Students have three attempts at each homework problem on subsequent chapters, and all learning aids are turned on. Additional ungraded practice problems with no learning aids available are optional for students and posted to Desire2Learn (the university's learning management system), in an effort to mimic exams.

A new option for homework assignment in MyLab Economics, Digital Interactives (DI) activities, are also assigned for credit by Koscianski. Each DI activity is focused on a single core topic and is organized in progressive levels. More specifically, each DI activity immerses the student in learning the material in an experiential way. The Opportunity Cost Interactive asked her students to plan out their day and determine the value of their time based on their opportunities, choices and goals. Working through three levels of decision making which get progressively more involved, students are able to participate in understanding the concept of opportunity cost experientially and see the concept in action. The Comparative Advantage Interactive has students stranded on an island, with their survival dependent upon how well they apply what they have learned about the concepts of the production possibilities curve and comparative advantage.

Koscianski assigns the DI for completion points—students have three tries to complete the DI and earn the full 10 points. Students not attempting the DI did not earn any points toward their MyLab score for that chapter. Koscianski was interested to see if the engaging aspect of the DI would help students understand these critical concepts, and, in fact, 76 percent of her students in a voluntary end of semester survey (Fall 2015, 96 percent response rate) responded that the active-learning aspect of the DIs on Opportunity Cost and Competitive Advantage helped them understand the chapter material more completely. As one student shared on the survey, “The DI forced me to get hands-on experience with the material that resulted in a better understanding of the material.”

The Digital Interactives are also available as a presentation tool, as a classroom real-world application of the concept which can alternatively be used as a group activity. “Pearson’s Digital Interactives are engaging learning tools that provide students with much needed extra practice on key concepts using mathematical, graphical and theoretical exercises,” said Koscianski. “In each class, students responded enthusiastically to these learning tools and gained a better grasp of key concepts.” Her students agree; 77 percent of students indicated the DI offered a more engaging out-of-class experience than traditional homework assignments. In the survey comments, one student revealed, “The Digital Interactives, while sometimes tedious, made learning the materials more interesting. It was nice to step away from the typical question-answer material and have a more exciting way of learning about the material.”

Following a Pearson best practice, Koscianski uses the problem assignment metrics in MyLab to direct her homework assignment creation. In the Assignment Manager, as she previews each homework question, she utilizes the Difficulty and Median Completion Time metrics to create an assignment that should take her students approximately one hour to complete. Students concurred, and in the end of semester survey, 54 percent of students indicated they spent one to two hours each week in MyLab with an additional 18 percent of students spending more than two hours practicing in the program.

Three exams are administered; they are pencil and paper, objective in nature, comprised of 40 multiple-choice questions of varying levels of difficulty, and timed to 55 minutes. Questions are similar to those assigned as MyLab homework, but not identical. Some questions involve simple recall of definitions or application of key terms, while others involve mathematical or graphical analysis. In addition, other questions ask students to make economic inferences regarding a specific value computed in a question. The purpose of the exams is to provide a means of evaluating the student's comprehension and understanding of the course material. Make-up exams are not allowed.

## Assessments

- 80% Exams (three)
- 20% MyLab Economics assignments

## Results and Data

After required MyLab homework was added to this course in Fall 2015, data show that average final course grades increased by five percentage points when compared to Fall 2014 (Figure 1). A *t*-test, which measures whether the means of two groups are statistically different (final course grades for Fall 2014 and Fall 2015 in this study), was used to compare these final course grades. Results of the *t*-test show that students in Fall 2015 (mean = 74 percent) scored higher on the final course grade than students in Fall 2014 (mean = 69 percent), where  $t(218)=-2.68$  and  $p<0.05$ , indicating that this increase was statistically significant. Average exam scores also increased (Figure 1), with two of the three individual exams (exams 2 and 3) showing an improvement of four percentage points each.

In addition, the percentage of students who showed mastery of course content by earning an A, B, or C for the final course grade increased nine percentage points in Fall 2015, and the percentage of students earning a D or F decreased nine percentage points (Figure 2).

Figure 3 shows a strong linear relationship of the final course grade distribution per average MyLab homework score. Students who earned higher average MyLab homework scores also earned higher final course grades. It should be noted that MyLab homework scores are 20 percent of the final course grade, influencing this relationship.

- Students earning a final course grade of A scored an average of 98 percent on the MyLab homework assignments.
- Students earning a final course grade of F scored an average of 67 percent on the MyLab homework assignments.

For students, the formative MyLab assignment grades are intended to help them identify where they are in terms of successfully completing the more summative course exams (additional research is needed to develop and test this concept further). Additionally, as a best practice, MyLab assignment grades are intended to help Koscianski identify students early on who are struggling and might be at risk of poor overall course performance.

Students who did not take at least two of the three course exams and stopped working in MyLab but did not officially withdraw from the course were excluded from this analysis; Fall 2014 ( $n=3$ ), Fall 2015 ( $n=3$ ).

### Exam and final course grade comparison

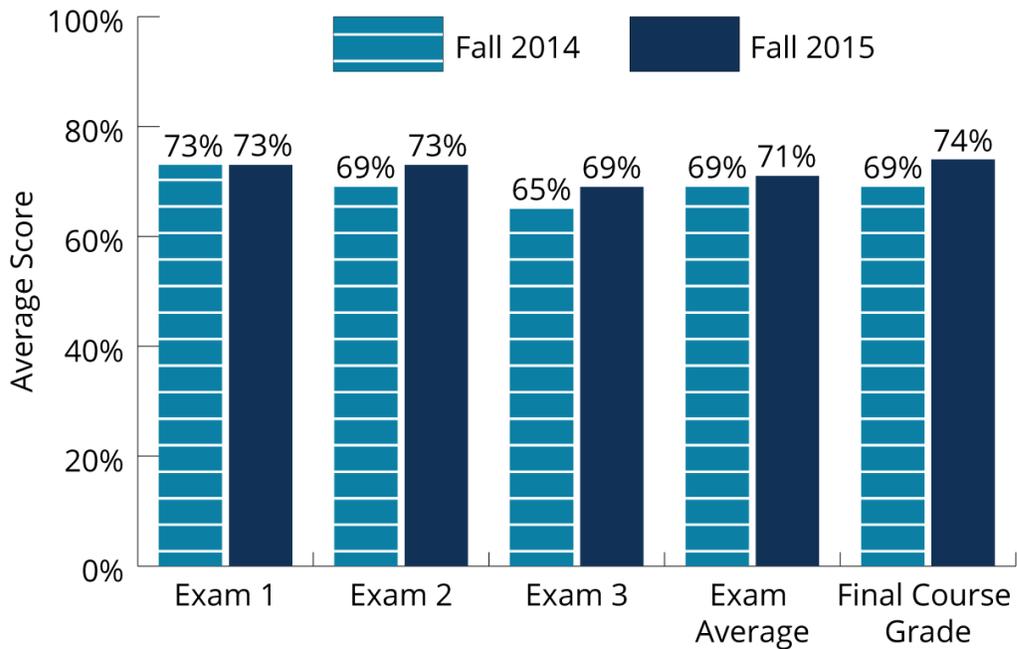


Figure 1. Exam and Final Course Grade Comparison Fall 2014, Before Implementation of MyLab (n=104) and Fall 2015 After Implementation of MyLab (n=113)

### Comparison of final course grades showing mastery of course material

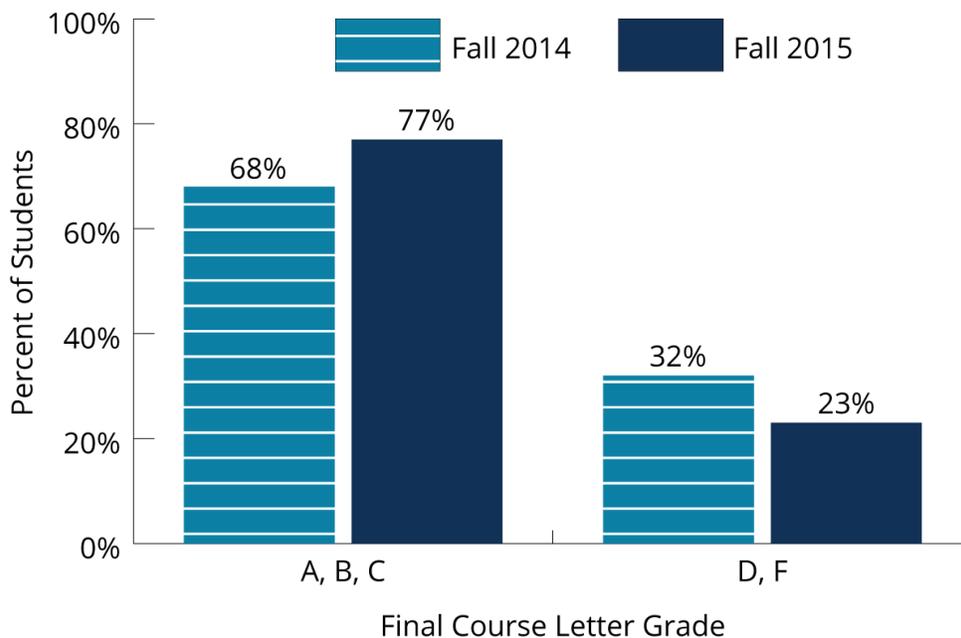


Figure 2. Comparison of Final Course Grades Showing Mastery of Course Material (Students Earning an A, B, C), Fall 2014 Before Implementation of MyLab (n=104) and Fall 2015 After Implementation of MyLab (n=113)

### Relationship between average MyLab score and final course letter grades

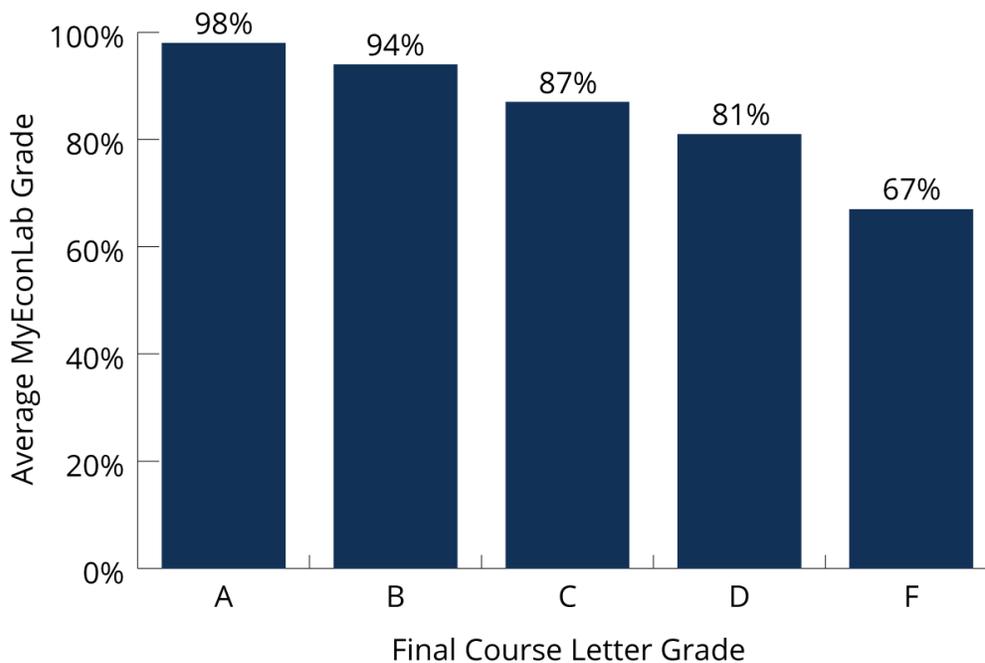


Figure 3. Relationship Between Average MyLab Score and Final Course Letter Grades, Fall 2015 (n=113)

### The Student Experience

Responses from an end-of-semester, Fall 2015 voluntary survey of Koscianski's students (96 percent response rate) indicate that the majority of responding students recognize the value of MyLab:

- 90 percent of students agree or strongly agree that the use of MyLab positively impacted their quiz and exam scores.
- 90 percent of students agree or strongly agree that MyLab provided additional resources that helped them learn more than they would have from more traditional pencil and paper homework.
- 92 percent of students agree or strongly agree that their understanding of the course material increased as a result of using MyLab.
- 77 percent agree or strongly agree that they would recommend to their instructor that she continue to use the Digital Interactives.

Student survey responses to the question "What did you like most about the Digital Interactives?" include:

- *"They took somewhat difficult concepts and turned them into a game which was much easier to understand."*
- *"It provided a different spin on regular homework. It provided more real life examples to think of when thinking of the topics."*
- *"It's one thing to be told how to do something, but it's better to be able to have to apply that knowledge to a real problem."*

- *"I feel that they helped me to better understand the subject than would any normal homework assignment. It really made me think about the situation."*
- *"Personally for me it helped greatly, because I am a visual person. So by using the Digital Interactives it gave me a much greater understanding of the material."*

Student survey responses to the question "What did you like most about MyLab?" include:

- *"MyLab is like having a practice test. It enables students to learn the material so they can understand it better. Instead of just making flashcards or finding another way to review materials, MyLab allows for review and a way to understand how to dissect different problems and find their solutions. It is a great way to learn and review!"*
- *"MyLab genuinely tries to help us students understand the material."*
- *"It provides instant feedback for answering questions. The instant feedback helps me get quickly back on track if I make a mistake on a question."*
- *"I like the ability to look up the subject of the problem in the text. I also like the option to get other similar problems. Both of these capabilities allowed me to better understand the concepts as opposed to just the individual question itself."*
- *"I liked all of the situational examples with the graphs. It really put your knowledge to a test to see if you truly knew how to apply the lesson."*

## Conclusion

MyLab Economics has initiated several opportunities for change and impact on Koscianski's teaching. Teaching three or four large sections of 40–50 students each semester allowed little opportunity for her to assign and grade homework meaningfully. With MyLab, she now has the ability to assign homework that mirrors the content she covers in lecture, that is immediately graded for student comprehension, and which offers students hints and visually worked examples when they are struggling. Additionally, Koscianski uses her gradebook for intervention purposes, identifying students who might be struggling and in jeopardy of Falling behind. Consequently, she can adjust her lectures immediately to address content that is challenging for students based on their incorrect answers in MyLab. She finds students seem more prepared for lecture and engaged in applying the content, two issues that are hard to address, particularly when students are required to take the course as part of a larger curriculum.