

MasteringEngineering

School Name [Morgan State University, Baltimore, MD](#)
Course Name [Engineering Mechanics](#)
Course Format [Lecture](#)

Key Results After implementing MasteringEngineering, students had more opportunities to practice problem solving with immediate feedback and grading. As a result, more students earned As and fewer students received Fs.

Submitted by
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Course materials
Engineering Mechanics: Statics, Hibbeler

About the Course

Morgan State University is a historically black college—approximately 90 percent of the students in Engineering Mechanics classify themselves as either *Black* or *African American*. A majority of students taking the course are first-generation college students, and all are noncivil engineering majors (primarily electrical, computer, and some industrial engineering).

The course itself covers resolution, composition, equilibrium of forces, analysis of force systems, and motion study. Course prerequisites include successful completion of Calculus II and College Physics.

Challenges

Because strong problem-solving skills are an important part of this course, I have always assigned paper-and-pencil homework. Combined with conducting research, running labs, training students, and teaching, however, it is difficult to grade homework on a timely basis, particularly without a teaching assistant (TA) to help. But when students do not receive timely feedback on their homework, their progress in the course can be hindered. To address this, I adopted MasteringEngineering in fall 2012.

Implementation

I initially chose MasteringEngineering because it enabled me to assign automatically graded homework. When I saw the additional resources available in it, I realized that my Gen Y students would like its interactivity, immediate feedback, and guidance. In addition, students appreciate the program's eText—a more affordable option to the textbook. I explain to my students that investing in this online resource will help them learn to solve problems and will help them to do better in the course.

I generally give one MasteringEngineering homework assignment per week allowing multiple attempts without penalty until after the third try. I select MasteringEngineering homework problems based on the topics covered in class. Homework is assigned at the beginning of the lecture on that topic, and is generally due a week later. I leave the assignments available so students can use them to review for exams, although they are unable to change their answers.

My goal is for students to focus on learning, not just scores.

Assessments

40 percent	Exams (2)
20 percent	MasteringEngineering
20 percent	Group project
20 percent	Final exam

Since implementation of [MasteringEngineering], the number of students requesting help during office hours has decreased, students are more excited about the topics and engaged during lecture, and more class time is spent on active learning.

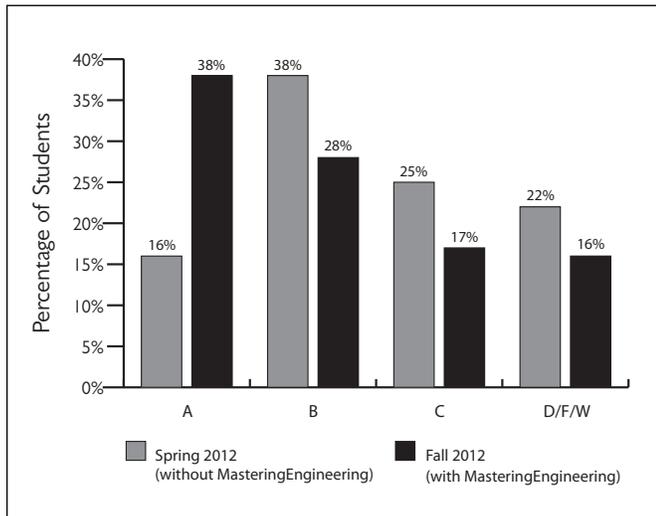


Figure 1. Mechanical Engineering Grade Distribution, Spring 2012–Fall 2012 (Spring 2012, $n=30$; Fall 2012, $n=26$)

Results and Data

In fall 2012, the first semester I used MasteringEngineering, there was a 22 percentage point increase in As and a 10 percentage point decrease in Fs. In addition, the course D/F/W rate dropped 6 percentage points (figure 1).

Further, the average exam score (of two semester exams) was 85 percent for students who attempted all of their MasteringEngineering homework. Students who skipped one or more homework assignment scored an average of 81 percent.

The Student Experience

Most students really like MasteringEngineering. They tell me they like its interactive environment—particularly the help/tip feature, which enables them to try problems with feedback that helps them understand their mistakes and then guides them in the right direction. They also like that they can work at their own pace.

Conclusion

MasteringEngineering provides students with instant feedback—they know right away where they need to remediate, and I save time by not grading homework. In addition, although I don't accept late homework, I can use MasteringEngineering to set up new problems or extend deadlines for students who miss class for excused absences.

MasteringEngineering's interactive, online format encourages students to work through problems and use the tips for help. Since implementation of the program, the number of students requesting help during office hours has decreased, students are more excited about the topics and engaged during lecture, and more class time is spent on active learning.

Although I have not taught the course since fall 2012, I recommended MasteringEngineering to the new instructor as an important course resource.