

Product Name **MasteringEngineering**
 Course Name **Engineering Statics**
 Credit Hours **Three**

Key Results MasteringEngineering’s automatic grading and immediate feedback features engage students and help them better learn course concepts. Students complete more homework and, as a result, both exam scores and success rates have increased.

Text

Engineering Mechanics: Statics, 13e, Russell C. Hibbeler

Implementation

This course covers the principles of statics and their application to engineering problems including forces, moments, couples, friction, centroids, and moments of inertia. The course is taught every spring and is primarily taken by engineering majors.

Homework and problem solving are very important to success in this course. Prior to adopting MasteringEngineering, I gave students paper-and-pencil homework, which had to be hand graded. I adopted MasteringEngineering in spring 2013 because it enabled me to assign students automatically graded, online homework that also provides immediate feedback and helps students master course concepts. As one student said, “MasteringEngineering tells you right away if you’re right or wrong so that you can rework problems if you made a mistake.”

My MasteringEngineering homework assignments consist of 10 or 11 problems including tutorials and end-of-chapter questions. Assignments are due following lecture and comprise a substantial portion of the course assessment.

Assessments

40 percent	Exams (four)
35 percent	MasteringEngineering homework
20 percent	Final exam
5 percent	Attendance

Results and Data

After my first semester using MasteringEngineering, course results indicate that student success rates increased—more students earned an A, B, or C in the course (figure 1). The mean exam score increased from 53 percent to 77 percent (figure 2). Note that although I changed the number of exams from three in 2012 to four in 2013, the same content was covered on the exams for both semesters.

I also evaluated my homework completion rates before and after using MasteringEngineering. For purposes of this case, an incomplete homework is considered one that had a score of 0.

- In 2013, 59 percent of students either completed all of the MasteringEngineering homework or had one incomplete assignment out of 35 total assignments. Those students had a mean exam score of 81 percent, while students who had two or more incomplete homework assignments averaged 72 percent on their exams.
- In 2012 when assigning paper-and-pencil homework, only 29 percent of students completed all of the homework or had one incomplete assignment out of 31 total assignments. Their mean exam score was 59 percent, and the mean exam score for students having two or more incomplete assignments was 50 percent.
- In 2013, 88 percent of students completed at least 90 percent of the MasteringEngineering assignments. In 2012, approximately 53 percent of students completed at least 90 percent of the paper-and-pencil homework.

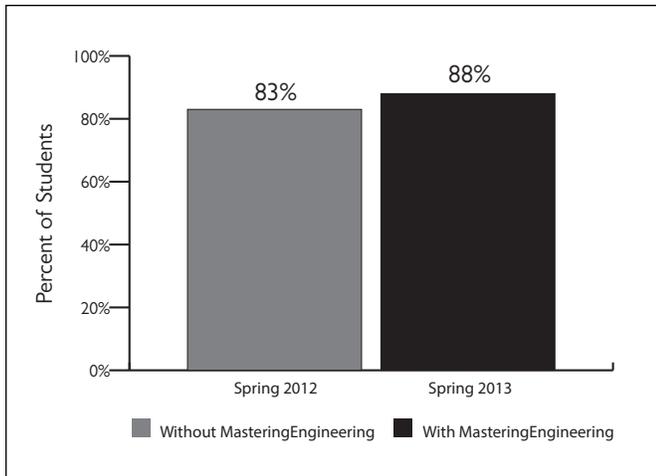


Figure 1. Statics Success (A/B/C) Rates, Spring 2012–Spring 2013
(Spring 2012 $n=17$, Spring 2013 $n=17$)

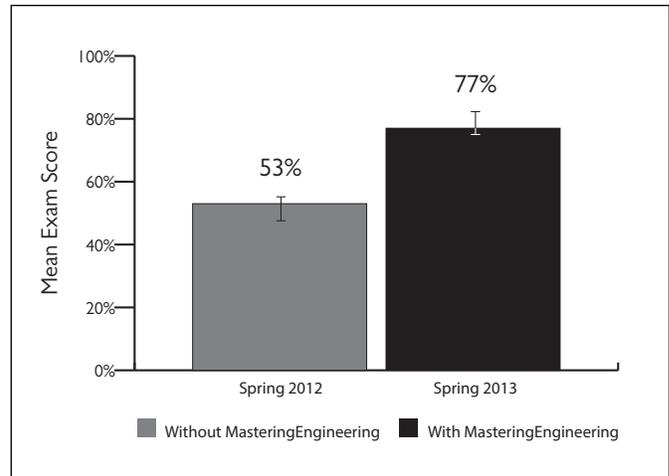


Figure 2. Statics Mean Exam Scores, Spring 2012–Spring 2013
(Spring 2012 $n=17$, Spring 2013 $n=17$)

“After my first semester using MasteringEngineering, course results indicate that student success rates increased—more students earned an A, B, or C in the course.”

The Student Experience

Responses to a spring 2013 survey indicate that students felt they had a positive experience using MasteringEngineering:

- 75 percent of students agreed or strongly agreed that their understanding of the course material increased because of using MasteringEngineering.
- 69 percent of students agreed or strongly agreed that using MasteringEngineering positively affected their exam scores.

Student feedback about MasteringEngineering included the following comments:

- “I liked the ability to have instant feedback on problems. By knowing whether the answer was right or wrong (and sometimes getting hints), I was able to more effectively learn from my mistakes.”
- “MasteringEngineering gave me a more in-depth understanding of the lesson taught in class, and also helped me get ready for the tests.”
- “I liked that MasteringEngineering gave me a step-by-step process to help solve difficult problems.”

Conclusion

After using MasteringEngineering for one semester in Statics, I found that (1) students feel it is an engaging and effective way to do homework, and (2) results indicate an increase in both homework completion and student success rates. I will continue using MasteringEngineering for Statics and now am planning to adopt it for my Mechanics of Materials class, too.

*Submitted by Boon-Chai Ng
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