UNIVERSITY OF HULL — Kingston upon Hull, UK

Product Name	MasteringEngineering
Course Name	Statics (as part of Fundamentals of Engineering and Mechanical Engineering Science)
Credit Hours	Three

Key Results MasteringEngineering saves time for the instructor and significantly increases student satisfaction, engagement, learning, and success.

Text

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

Implementation

Statics covers a two-semester course sequence that draws a variety of students, often with a wide range of math competency. Student enrollment has increased exponentially in recent years from approximately 60 students to close to 200 currently.

The course format is mainly problem-based learning and was developed when enrollments were smaller. Prior to 2011, there were two or three paper-and-pencil assignments each semester, plus a weekly tutorial session, where it was intended that the students would work on the assigned questions. Tutorial sessions were poorly attended. As a result, the general level of understanding was low, which was reflected in exam and course scores. In 2011, I began giving weekly not-for-credit paper-and-pencil assignments in an effort to increase attendance at the weekly tutorial sessions.

I piloted MasteringEngineering in the 2012 academic year. The previous statics courses had two lectures and one tutorial hour per week. The tutorial hour now takes place in a computer lab, with myself and four teaching assistants.

I had several reasons for adopting MasteringEngineering. First, with nearly 200 students, automated grading saved time. I also wanted students to engage more with the course material and to gain a broader understanding of the subject. In addition, being able to look in the gradebook and see who has and hasn't done the assignments gives me an immediate snapshot of the engagement of the class. Plus, I wanted to update my teaching, and to have students feel that they were using technology for learning and were getting their money's worth for tuition paid.

Each week, I assign approximately four, not-for-credit questions in MasteringEngineering, making sure they are relevant to the lecture and include a mix of tutorials to increase understanding and test their knowledge. I often briefly go over each question in the lecture preceding the tutorial, so students know what to expect. The idea is that they start the work in the tutorial session and complete it by the end of the week. It is not mandatory, but I let them know that I check the results. Although these questions don't contribute toward the course grade, I email individuals who haven't attempted any. If students demonstrate specific problems with the questions, I work those in class.

For credit, students have online homework consisting of eight questions in MasteringEngineering that they have two weeks to complete, a paper-and-pencil assignment, and one traditional exam.

All of the problems that have been assigned over the year are available to the students until the end of exams. I encourage them to use this and the study area of MasteringEngineering to review for the exam.

Assessments

80 percent	Exam
15 percent	Paper-and-pencil homework
5 percent	MasteringEngineering homework

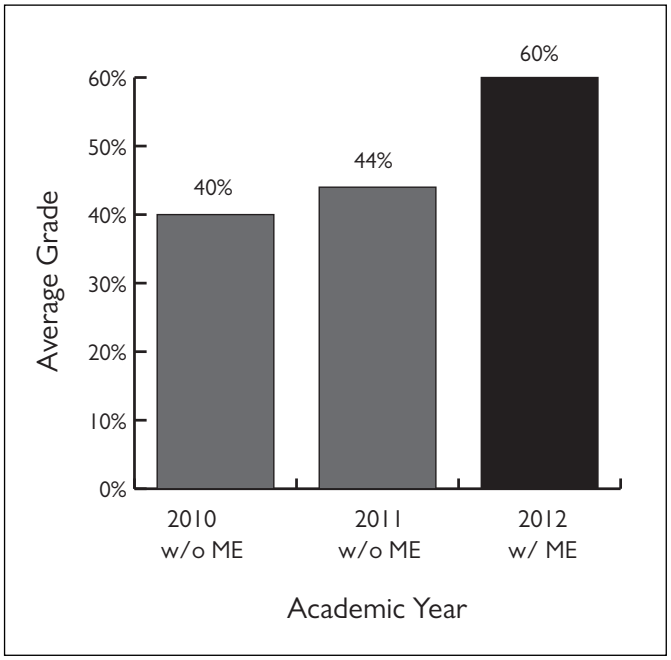

Figure 1. Statics Average Final Course Grade with and without the Use of MasteringEngineering, 2010–2012

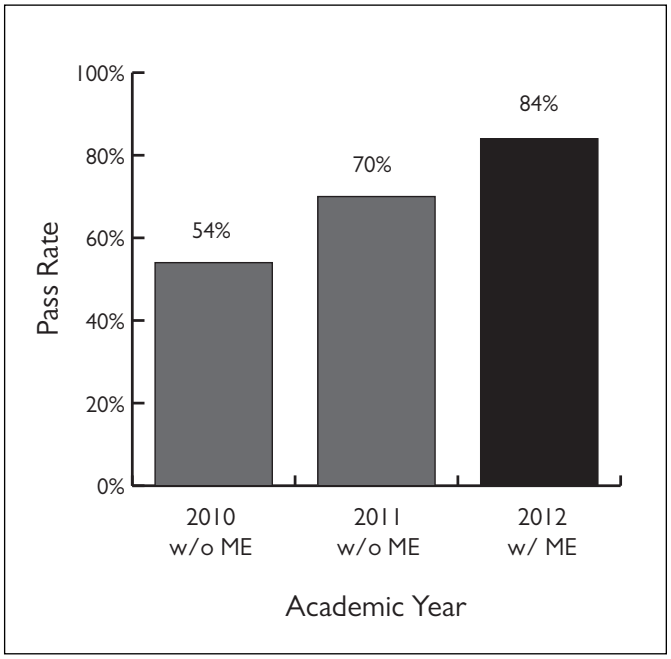

Figure 2. Statics Pass Rates with and without the Use of MasteringEngineering, 2010–2012

Results and Data

Figures 1 and 2 show an improvement in student performance after the implementation of MasteringEngineering, as indicated by an increase in both average course grades and pass rates. What's more, there was an increase in student enrollment over this same period.

The Student Experience

The students are more engaged with the course content, and appear to be tackling problems much earlier than in previous years. A number of students have commented to me that they found MasteringEngineering to be an extremely useful tool.

Conclusion

MasteringEngineering is an excellent resource to improve student engagement and performance. Assigning tutorial problems weekly is a positive incentive to students, and instant access to students' progress is a good way for me to identify less-motivated students. In addition, the online assignments are ideal for large courses and make it possible to quickly assess the weekly assignments.

With careful planning, MasteringEngineering can augment lecture material and improve learning week by week. The first year of implementation presented a learning curve, but I now feel extremely confident with the program and look forward to tweaking the assignments this year.

Submitted by Catherine Dobson
University of Hull