

MasteringEngineering™

EDUCATOR TESTIMONIAL UNIVERSITY OF HULL

COURSE:	Statics [part of 'Fundamentals of Engineering' and 'Mechanical Engineering Science']
TEXT IN USE:	<i>Engineering Mechanics: Statics</i> , Hibbeler
USED SINCE:	2011
SUMMARY:	This lecturer at the University of Hull wanted to include online learning in the mechanics course to make it more engaging for students. After implementing formative and summative assessment in MasteringEngineering the average marks and the pass rate increased.
SUBMITTED BY:	Catherine Dobson , Department of Engineering

snapshot of the engagement of the class. I also wanted to update my teaching – schools now utilise online learning methods and I wanted students to feel that they were on a modern course and getting their money's worth (bearing in mind tuition fee increases).

Assessment

The course is assessed via one assignment comprising 8 questions in MasteringEngineering which they have 2 weeks to complete; 1 paper-based assignment to ensure that the students are used to setting out the working as they have been shown; one traditional exam.

Implementation

After being shown MasteringEngineering I realised that this could be ideal for my courses. I had one very old, dated looking piece of software that students found useful as a learning tool, but it was very limited in its capabilities. In June/July 2011 I persuaded the outgoing and incoming heads of department

Course design (background)

We are a traditional university engineering department with a wide variety of students taking these 2 first year modules, ranging from 1st year MEng students to 2nd year FdEng students. Due to this there can be a huge variety in the maths competency across the class. Student numbers have increased exponentially in recent years from approximately 60 students to nearer 200 now. The course is mainly problem based learning, but there have been difficulties in the past getting students to attend tutorials and work through the examples given.

The course was devised when the class was smaller and had paper based assignments. There were 2 or 3 assignments a semester, with a weekly tutorial session, where it was intended that the students would work on the assignment questions. This was poorly attended and as a result the general level of understanding was low which was reflected in the exam marks.

I had two main reasons for wanting to change to MasteringEngineering. Firstly, with nearly 200 students, online marking was very attractive! Secondly, I wanted the students to engage more with the work and to have a broader understanding of the subject. Being able to look online and immediately see who has and hasn't done the questions set, gives me an immediate

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to allow me to try MasteringEngineering for a year, using the reduced amount of hours the department would have to pay demonstrators as leverage. When I returned in September the implementation began. The only barrier to making the change was trying to get all the students registered as there were quite a number arriving weeks into the course. Another unavoidable difficulty was familiarising myself with the software, and the need to peruse and choose the questions to set every week, with little time available. Obviously this only occurs in the first year of use, and this year I am looking forward to tweaking the assignments, rather than setting them from scratch. A webinar by a user at the University of Manchester was very helpful to me.

The courses each have 2 lectures and 1 tutorial slot per week. The tutorial slot now takes place in a PC lab, with 4 demonstrators and me. Each week I set questions relevant to the lectures on MasteringEngineering, usually about 4



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questions, and a mixture of tutorials to increase understanding and also questions to test their knowledge. I often briefly go through what each question is about in the lecture preceding the tutorial, so that the students know what to expect and don't only attempt the first question in the set. The idea is that they start the work in the tutorial session (Tuesday) and complete it by midnight Sunday. I don't tell them it is compulsory, but I let them know that I check the results each week. These are not assessed, but I do email individuals who have not registered or who have not attempted any questions. If students have particular problems with any of the questions I then go through them in detail in class.

All the problems that have been set over the year are available to the students until the end of the resit period, and I encourage them to use this and also the "Study Area" feature to aid in their revision.

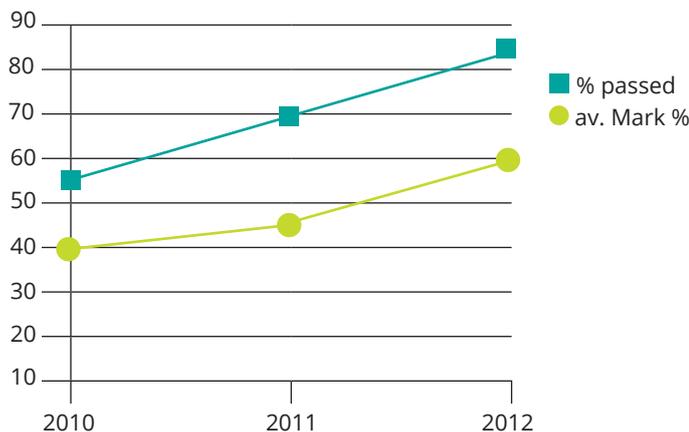
Course results

ANECDOTAL EVIDENCE

The students in general are more engaged with the course, and appear to be tackling problems much earlier than in previous years. A number have commented that they have found the software an extremely useful tool. There are some concerns from the students that working is not taken into consideration, and also some of the rounding of answers is inconsistent in the software.

STATISTICAL EVIDENCE

The graph below shows the improvement in student performance in the last three academic years. There is a good improvement both in pass rate and average mark. It is worth noting that there was an increase in student numbers over this period from 70 to 127. I did not introduce MasteringEngineering to the students until 2012. The increase in 2011 was due to my revamping of the course and the assessment. However it can be seen that there was significant improvement in student achievement for the year where MasteringEngineering was implemented.



Conclusions

MasteringEngineering is an excellent tool to improve student engagement and performance. Formalising tutorials with problems set weekly, along with instant access to students' progress is an incentive to students and a good tool for me to chase slackers! Online assignments are ideal for large student numbers and make possible the quick assessment of weekly set work.

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



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In brief

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- With careful planning the software can augment lecture material and improve learning week by week.