

## **Embedding Enterprise in Engineering - Reality Teaching Through a Business Planning Module**

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Subject Area: Entrepreneurship

Study Completed: May 2005

This case study has been developed from data gathered through a demonstration of the teaching and learning materials available, interviews with the tutor and a student focus group.

### **Background**

The Business Planning module is run in the final semester of the Masters in Engineering programme at the University of Sheffield. The students are divided into teams and given a real commercial problem provided by real customers. They are asked to apply their engineering knowledge to solve the problem and write a financially and commercially viable business plan. This year, for example, the students were asked to develop new ideas and improvements to child safe packaging for pill based medication.

Throughout the module the lecturer is principally a facilitator and a mentor. The students receive just 10% to 15% traditional lecturing. The remainder is based on case studies, workshops and presentations from invited speakers such as bankers, customers, intellectual property consultants and entrepreneurs that take place weekly in the 2-hour timetabled teaching slot. The case studies and presentations are delivered in a flat room with the tables arranged so that students can sit in their teams and discuss ideas between and after presentations. The teams also receive support from research groups in the department and get advice from a 'real world' mentor who provides support, guidance and focus during tutorial sessions that are scheduled by the team.

As this module is taken by students from different engineering subject areas (including mechanical, chemical and electrical engineers), there is considerable emphasis on realistic scenarios, calling on the students' capacity to deal with various problems such as team working and team management. The aim of the module is to bring all the students' skills together to address marketing, financial, intellectual property, operational and entrepreneurial issues by providing them with a real commercial problem.

The module is formally assessed through the teams' submission of a business plan; assessors include external consultants, and a panel of academics. Teams also present a poster and complete an elevator pitch (a timed presentation) for their 'company'. The assessors together with the 'customer' then decide on the best solution and the winning team receives a prize. There is also an opportunity to pursue the project further if the team and customer agree.

### **Reasons for introducing this teaching method**

Engineers are the ultimate technology designers and yet commercialisation is often difficult for them to visualise. Conventional enterprise and business planning modules can seem boring and pointless particularly for Mechanical Engineering students. Here the tutor felt that the students were given *"the opportunity to study unconventional modules to support and encourage them to realise their technical skills in a more commercial way"*.

The University of Sheffield is part of the White Rose Consortium, whose role is to "...facilitate and support partner universities encouraging creativity and innovation ....". The department wanted to make a concerted effort to increase students' entrepreneurial potential and the tutor was hired to develop an 'enterprise culture' within the department. As part of this commitment the Business Planning module was started 3 years ago and continues to develop with over 10 representatives from businesses and organisations supporting this year's module.

### **Lecturer's perspective**

The department was very supportive of the development of this module. The department encourages

staff to develop innovative teaching and learning methodologies questioning motivation for change to maintain a focus on the benefits for students. *“Sometimes, especially half way through the semester, I think ‘is it working?’ as I cannot really see what’s going on, but by the end of the semester both students and I are pleased with the results.”* The number of students taking the module has increased every year and this year 3 PhD students also opted to take the module. An enterprise-lab has also recently been launched in the department, with space dedicated specifically to the practical learning and development of entrepreneurial skills.

### **Students’ perspective**

Some students were sceptical at first about the module, seeing it as ‘non-engineering’, but all those participating in the focus group had found it interesting and could now see its usefulness in the future. In particular they valued the inclusion of many guest lecturers within the course; *“given the subject matter, this is the sort of thing which is done better by getting in experts in a particular area to come and talk about it”*. The students also welcomed the informal and interactive nature of the lectures; including question and answer sessions with the speakers, and quizzes to test their knowledge. Although it was felt that this module could have been taught using traditional lecture and exam methods, the combination of a ‘real’ problem, mentor sessions and guest speakers had helped motivate the students to become more involved in the work. *“This has been more about learning than passing an exam.”*

The module is run in the second semester of the students’ final year when some students would have preferred to have all their time to dedicate to final year projects and dissertations. Others thought it made *“a nice change”*. *“It’s also quite nice to see how what you’ve learnt about engineering can be translated into something real.”*

### **Issues**

The module relies on the tutor being able to identify and gain commitment from businesses with real commercial problems, as well as other external practitioners who are willing to contribute to the activities and this is very time consuming.

Not all students have studied the same modules previously and some need more support through additional tutorials on the financial planning or marketing elements of the project.

### **Benefits**

Through the effective embedding of the module within the engineering curriculum, the enterprise culture in the department has become stronger. The tutor also felt that initial negative responses by some academic staff had now given way to positive and constructive support for the work.

The tutor sees embedding enterprise in engineering as a real challenge as students often do not see the relevance of it. This led to a drive to get students excited about enterprise, *“but I’ve learnt that the greatest achievement has been getting students excited about learning”*.

### **Reflections**

The students were grateful for the multiple opportunities, through mentor sessions and tutorials, to receive feedback on their ideas. The students also responded well to being asked for feedback as they could see that the tutor was responsive and put a considerable amount of time and effort into running the module.

Although not realised initially, it has now been recognised that many of the design ideas generated have Intellectual Property that could be exploited and this is now being supported.

*“Students are very complimentary about this module. I get such satisfaction by knowing how much students enjoy this module. They find it amazing, having the opportunity to meet a real client and use their technical skills to tackle a real problem.”*