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## Creating a learner-centred approach in product innovation

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## Creating a learner-centred approach in product innovation

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Subject Area: Product Innovation  
Study Complete: April 2008

*This case study has been developed from data gathered through observations of the teaching component; interviews with the tutor; and a student focus group.*

### Background

The University of Hull provides modules in product innovation in a range of its engineering courses. The courses aim to introduce students to, and develop the ideas and concepts central to, product innovation from a wide range of industries. The teaching team has significant industrial experience and are based within the university's Engineering Innovation Institute (EII). The EII aims to facilitate growth and diversity in industrial related teaching within the department as well as to provide support for local economic development through offering consultancy and CPD to local industries.

One example is the first year product innovation module which focuses on concept development, emphasising that product innovation is a process rather than an event. It introduces the fundamental principles and drivers for product innovation including markets, consumers, competition, opportunities and technological developments. Awareness of the tools and techniques to support product innovation continue to be developed during year two through the study of the evolution of real products on the market today and case studies of failed designs. Students are assessed through short coursework exercises and an end of module exam on tools, techniques and case study analysis. Third year product innovation students complete a "cradle to grave" product design project with mentor based support from staff within the EII which is assessed by portfolio.

### Reasons for introducing this teaching method

The tutor originally developed a hybrid MBA in engineering innovation which was a joint programme offered by the Engineering and Business schools. The tutor wanted to draw on his background in industrial product management and develop a programme which was based on his "experience of commercial reality." The tutor had also previously worked on the PROGRESS project which aimed to share practice in improving levels of student success in Higher Education engineering programmes. The research conducted as part of the project highlighted the use of design as a motivator for undergraduate students and the modules developed aim to build on this through using industrial focussed product examples: "from the point of view of undergraduates, I think the industrial experience is more empowering to them, in a way that's what they expect engineering to be about."

### Lecturer perspective

The tutor was motivated to support the students' learning experience by balancing theory with practical experience. The timetabled lessons are primarily seminars given in a design studio. The tutor gives a short presentation on a particular principle and then leads discussions based on a case example. For example, this may be a physical product which students are encouraged to handle, discussing how the case study relates to the processes and strategies being presented. Product design assignments give students the opportunity to apply the theory they have studied: "That sort of interactivity is, I think, the basis of it. It has to be rooted in practice. With innovation you have to try it. Those guys [students] are just learning the background ... here they get the chance to try it". Developing problem solving skills in undergraduates this way was also felt to support "what the market wants" for graduates. The dynamism and interactivity of the sessions generated a constant flow of ideas which the tutor felt was "extending and improving the student experience."

## Students' perspective

The students who participated in the focus group were first year students on the Level Four Product Innovation One: Concepts module. The students saw the module as being based on case study theory. The sessions ran like practical based tutorials and gave them an opportunity to consider design concepts, complete design exercises and product dissections. The most useful aspects of the module were seen as the "learning by doing" approach and the links with business models. The approach offered them a "practical sense of the real world" and an opportunity for "learning from others' mistakes." The students felt more "prepared for future as a designer."

The students commented that the material was easier to learn because of the "interaction with the lecturer", "easier to absorb information", "not just two hours of being talked at and getting bored." The students would prefer more of their classes to be taught this way, however they did appreciate that "this would be hard to replicate in a lecture theatre environment." Small group teaching was seen as less "intimidating", for example here they could ask a question without "stopping everyone else from learning". They also saw the benefit of the in class discussions providing them with an opportunity to "learn from fellow students" offering an experience more akin to "design in the real world."

## Issues

The tutor found developing the ideas for the course easy, based on "common sense" from his industrial background, however the implementation was difficult because of the university "culture that's predicated on research excellence .... from the point of view of undergraduates, I think the industrial experience is more empowering to them, in a way that's what they expect engineering to be about."

The tutor highlighted the need for those running the teaching activities to be "comfortable with managing a dynamic situation toward achieving the learning outcomes there are not necessarily right or wrong answers to be had; the object is capability and confidence building." "The steepness of the learning curve to get ideas off the ground was seen as daunting to students at all levels: "younger students may question their key skills (even drawing ability) while the more mature baulk at the complexity of team based project management and the integration of commercial aspects. Tutors need to recognise the intimidating nature of open ended tasks and offer regular guidance and reassurance, together with a framework of staged programme targets."

## Benefits

Feedback received by the tutor from graduates has indicated that the holistic nature of innovation modules is a big asset in job interviews, as it demonstrates experience in a quasicommercial exercise and provides a focus for discussion around a tangible and contemporary idea rather than simple proficiency in knowledge assimilation.

## Reflections

The modules are designed to draw on the expertise of the teaching team and their recent experience of working within industry. With the teaching and mentoring staff also working within the EII they can keep the materials used with the students commercially relevant and can refer to knowledge transfer projects they are currently working on so that students can see the links to real world scenarios.

Originally developed for mechanical engineering, the number of product innovation modules being run has grown over time and is now offered across a range of engineering programmes. The EII has also been approached by an industrial panel to develop a CPD course based on the product innovation masters' level module.

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