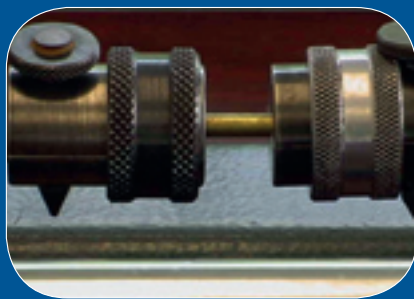
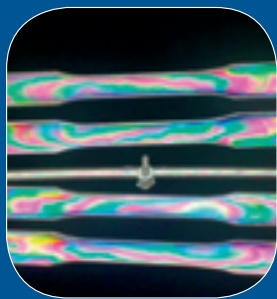




Enhancement of Industry-based Teaching in the Department of Materials

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ENG CETL

 Loughborough
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Introduction

This case study illustrates how a development project undertaken by engCETL in association with Loughborough University's Department of Materials (previously the Institute of Polymer Technology and Materials Engineering or IPTME) has made an important contribution to the process of furthering its links with industry, particularly those relating to students' 'sandwich year' placements.

Context

The majority of engineering and science courses at Loughborough University offer their students the opportunity to undertake a 'sandwich year' of industrial experience between the second and third year of the undergraduate degree. These industrial placements are fully integrated into the students' programmes of study as a supported period of work-based learning. They are formally assessed leading to a Diploma in Industrial Studies (DIS), which is offered as a supplementary award to a student's degree.

The DIS is always part of a teaching module, with formalised Intended Learning Outcomes, Content and Assessment Methods. In the Department of Materials, the module is MPI001. The assessment schemes will no doubt vary between departments, so the information below is that which 'typically' might be included.

To obtain their DIS, students must satisfactorily complete:

- A minimum of 45 weeks of Professional Training with a company, by completing a series of learning experiences to broaden their awareness of their degree subject in a commercial context.
- A formal Record of Training to be maintained during the placement and to be assessed as required by their Academic Tutor.
- A Technical Report to be completed on some aspect of the work undertaken during the period of training, to be assessed by a Company Manager and the Academic Tutor.
- An Oral Presentation at the workplace on some technical or commercial aspect of the training received, which is formally assessed.
- A competent performance of duties given by the company providing the placement to be assessed by a Company Manager.
- An honours degree programme.

The companies offering industrial placements are asked to provide a series of work experiences relevant to the student's degree (including those relating to industrial organisation, technical functions, purchasing and management), which require a level of intellectual involvement that is appropriate to a post second-year undergraduate student. They are also asked to provide:

- A suitably qualified Company Manager to act as the student's Industrial Supervisor and Assessor.
- A stimulating working environment in which the student will have an opportunity to develop her/his personal and employability skills.
- The facilities to enable the student to give an oral presentation at the end of the placement.

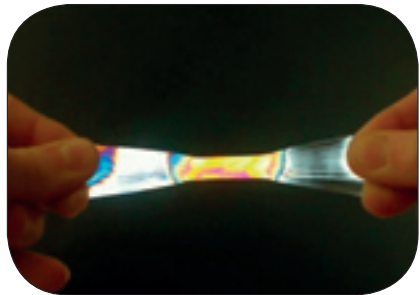
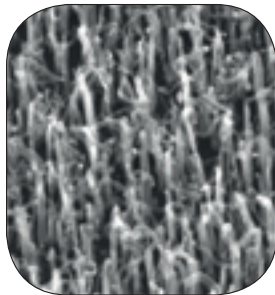
In return, like the other participating departments at Loughborough University, the Department of Materials undertakes to provide:

- An Academic Tutor for each student to support all aspects of the training during the placement period.
- Guidance on the implementation and assessment of the professional training given to the students.
- If necessary, a member of the relevant professional body to act as a mentor to the student in building up their record of training.

Important as these collaborative links are with companies via the operation of the DIS placement scheme, they form only part of the Department of Materials' wider engagement with industry, which includes research and various forms of input from industry into the students' learning experiences. The latter include: membership of advisory groups; hosting industrial visits; providing case studies; and making contributions to lectures, seminars and training courses.

Problems

The Department of Materials offers the DIS option to all four of its undergraduate programmes, and has always encouraged its students to take advantage of this career opportunity wherever possible. To that end, it had its own well-tried mechanisms in place for monitoring and assessing students' progress – processes and procedures that were held in high regard by its industrial partners in the scheme. However, as a relatively small department with fewer students than many others, the management and implementation of the whole DIS scheme took a disproportionately large amount of staff time. The creation of an industrial placement website was seen as an opportunity for the Department of Materials to improve all aspects of its provision for the benefit of the key stakeholders – its students, staff (academic and administrative) and industrial partners.



In addition, the Department was fully committed to the incorporation of a DIS option into all of its undergraduate programmes, including Applied Design (now 'Design with Engineering Materials'), which it had launched in 2003. However, it was becoming increasingly apparent that a short-term input of additional staff resource was urgently required to:

- Develop the database of industrial placement opportunities available to students taking the Applied Design course option.
- Create new links with industry in order to promote the Department of Materials postgraduate courses, increase the recruitment of part-time postgraduate students and facilitate the on-going development of the design and delivery of its study programme.

In May 2006, Barry Haworth from the Department of Materials submitted a development project proposal to engCETL for consideration by its Panel, as a first step in addressing these problems.

Project aims

The immediate aim of the work to be undertaken by the resultant project was to develop new links between the Department of Materials and industry in order to:

- Promote its postgraduate courses.
- Increase the recruitment of part-time postgraduate students.
- Increase the availability of DIS placement opportunities for its undergraduate students, particularly for those studying Applied Design.

These intended outcomes were part of a wider programme of on-going work aimed at furthering the Department's links with industry undertaken in collaboration with engCETL and its other university partners. These included the creation of a DIS website (and the separate, but related development of an Engskills version of the RAPID Progress File), which is the subject of a separate development project case study in this series.

Key dates

May 2006	Submission of project proposal to engCETL by Barry Haworth
Nov 2006	Interim Report by the Industrial Liaison Officer
June 2007	Final Report by the Industrial Liaison Officer

Project actions

EngCETL's Industrial Liaison Officer, Richard Newman, worked closely with the staff in the Department of Materials to generate lists of possible contacts i.e. suitable companies and the names of their employees. This enabled him (by means of emails, telephone conversations and visits) to approach approximately one hundred companies to promote the Department's postgraduate packaging course and a further twenty or so companies regarding industrial placements for Applied Design students choosing the

DIS option. This painstaking groundwork enabled him to create an up-to-date database of packaging companies, which the Department of Materials staff could use, not just in connection with their students' placement learning, but also to further their wider links with industry.

In addition to the activities described above, staff from the Department of Materials collaborated in another engCETL project, which created a DIS website (and the related work undertaken by the RAPID project team on the development of an engineering version of the RAPID Progress File).

Outcomes and impact

This development project was a significant departure for engCETL, in that unlike the majority of its previous projects it was not technology based, and as such it did not produce an e-tool that could be used either to improve the administration and/or management of teaching and learning, or to enhance the quality of the students' experience. It required a different input of expertise therefore, from the centre staff – in this case in industrial liaison rather than educational technology. Nevertheless, the project had many underlying similarities with engCETL's successful technology-based interventions in that:

- It focussed on addressing authentic problems relating to an important aspect of teaching and learning identified by the staff in a department, was consistent with institutional policies and relevant to the main aims of engCETL.
- It was not conducted in isolation as a 'one-off project', instead it was part of a wider programme of work aimed at furthering links with industry that built upon the successful outcomes of previous projects (e.g. the EQUIPE project¹ in Chemical Engineering).
- It required a short-term input of specialist expertise from engCETL, which was not currently available to the department from other sources.
- It involved working towards a common purpose as a 'community of practice' (Lave and Wenger, 1991; Wenger, 1998) i.e. through close collaboration between engCETL and staff in the department.
- A 'climate of readiness' had been created in the department for the adoption and use of the outcomes of the project.

That said, this was a groundbreaking project, and as such its outcomes should perhaps be judged in terms of the way in which it demonstrated engCETL's capacity to collaborate in developments that were different from those it had previously undertaken. More generally, it highlights the value of a university being able to support new initiatives aimed at enhancing aspects of teaching and learning by making available specialist staffing resources – in this case in industrial liaison – not normally available within a department.

¹ EQUIPE (Educational Quality in Placements in Engineering) was a project sponsored by the Higher Education Funding Council for England (HEFCE) by means of its Fund for the Development of Teaching and Learning (FDTL). The project, which identified, evaluated and disseminated widely good practices in industrial placements in engineering, concluded in 2001. Further details can be obtained from: <http://equipe.lboro.ac.uk>

Discussion

It is not surprising that whilst the short-term objectives of this project were achieved in the agreed timescale, its immediate impact in terms of furthering the department's links with industry was relatively modest. The reason for this is that even with regard to industrial placements within a scheme like DIS, establishing contact with employers is located at an early stage in the development-implementation process. According to a model for good practice articulated some time ago by Coates and Wright (1991) this can be thought of as a multi-stage process that starts with planning of programmes of study that include an element of work-based learning in the form of an industrial placement, and culminates with evaluation. Making the initial contacts with companies about their participation in such a scheme comes at a very early stage in that development-implementation process. The expectation is therefore, that appropriate and well-managed follow-up actions by the Department will enable the real benefits of this project to accrue in the medium and longer term and will be manifest, both in the number of industrial placements the new contacts yield, and in the wider gains that will be derived from the departmental links with industry. Other issues and collaboration opportunities were obviously encountered in some of the industrial liaison discussions, such as external speakers, contract/testing work, career opportunities and possible research collaboration.

This suggests that in terms of managing change, the work of a short-term project such as this, which has very precise objectives, needs to be seen by those seeking to use its outcomes as part of a wider long-term strategy for continuous improvement – in this case developing successful partnerships with industry in order to build up the department's so-called 'network capital' (Henley Management College, 2002) as means of achieving its strategic goals. This is currently at the centre of a major UK policy issue, not just for individual departments and institutions, but for the whole HE sector. This is because in recent years the government has provided funding through the Higher Education Funding Council for England (HEFCE) to promote engagement between employers and HE. This was accompanied by the publication of a review (Leitch, 2006), which proposed a target of 40% of all adults in the UK achieving a university-level qualification by the year 2020 in order to promote economic growth and increase global competitiveness. As a result, the government would now like to see a proportion of HE being funded by demand-led mechanisms, and a greater number of graduates with the necessary employability skills being produced in the key areas of science, technology, engineering and mathematics (STEM) subjects. To satisfy this need, many future graduates will have to come from those members of the population already in the workforce. The employer engagement agenda therefore, is of particular significance to departments at Loughborough such as the Department of Materials and other engineering departments – as indicated in a recent report (New Engineering Foundation, 2007) – for reasons which go well beyond the immediate purposes of this engCETL development project.

Fortunately, there is no shortage of guidance available to practitioners on how they can begin to address the new employer-engagement agenda including that which can be derived from engCETL (e.g. a guide to industrial placements for small and medium sized employers based on the work of the EQUIPE project) and from the Higher Education Academy Engineering Subject Centre (e.g. its 2008 guide to industrial placements and the recent report on its engage project). The Quality Assurance Agency (QAA) for Higher Education (2007) is a further source of up-to-date guidance on matters relating to work-based learning,

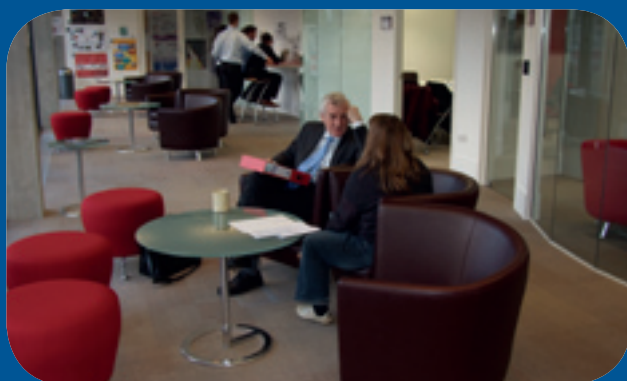
as is a report by Brennan (2005) for the University Vocational Awards Council on integrating work-based learning, as is a report by Brennan (2005) for the University Vocational Awards Council on integrating work-based learning into HE. However, the challenge now facing practitioners is not just a matter of improving the quality of what they currently do with regard to engaging with employers, but beginning to meet the new demands to equally high standards.

Conclusions

This development project was underpinned by the same principles of good practice which have guided the CETL's selection and implementation of projects, and it was not surprising therefore that it succeeded in achieving its intended outcomes within the planned timescale. In terms of advancing the Department of Materials' links with industry, the groundwork undertaken by the project in establishing the new contacts' database, will have to be acted upon by the department itself. However, the changing policy agenda now facing HE suggest that those actions will need to be seen as part of a much wider strategy for furthering its engagement with employers.

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ISBN 978 1 907382 11 6