New industry/education links in Brunel's BSc in industrial design

Practical building of industry/education links

E H Billett and P Turnock
Department of Design, Brunel University

Abstract

The Department of Design at Brunel has been involved in the Enterprise in Higher Education Initiative on a number of activities including student centred learning and the introduction of industrial input into project work.

Many Art and Design colleges have included industrial sponsorship in a block project, often in the form of a competition. Because our BSc in Industrial Design is largely linear in its teaching, in order to accommodate its high technological content, this pattern of block projects did not fit us at all well.

We wish to report on our success in establishing long term working relationships with companies, spanning the entire year, and to describe the benefits of this collaboration, both to the students and to the whole department.

Industrial Design Education within the United Kingdom encompasses a broad spectrum of subjects; loosely combining the creative aspirations of product design students with the means of producing numbers of artefacts through recognised industrial processes.

The two extremes of styling and engineering design are regarded as Industrial Design's parameters and each course is built somewhere along this line. How far towards Engineering Design a course establishes itself is dependent on a number of factors; core philosophy of the institution, the academic standard of the course structure and the numerate character of the students. The perceived requirements of Industry are not to be omitted from the mix.

At Brunel, a University built on the firm foundations of applied engineering, we have established an Industrial Design course by marrying the crafting of materials in the Bauhaus tradition with the ability to predict the performance of planned products through sound technological reasoning. Our teaching does not equip students to totally engineer componentry, nor does it incubate blue sky dreaming to the exclusion of practicality. The Industrial Design we practise is focused on many technical and creative subjects; all leading to a total awareness of product design complexity - we educate communicators of design. At Brunel we believe that Industrial Design is primarily a team activity, interdisciplinary, and that good communication in a broad range of subjects leads to the implementation of good design.

We teach implementation skills - skills required by industry, not just to conceive ideas but, most importantly, to make ideas into real products. To this end, our thin sandwich course structure gives students up to 12 months of real experience in design, planning or engineering environments, but more recently we have begun to incorporate real client projects within the academic timetable to improve the understanding of implementation within industry.

A thin sandwich course, incorporating two work placements, is an ideal system for the teaching of design - academic learning interspersed with practical experience. However, industrial placements vary considerably in their direct relevance to the subject and participating companies integrate students within a continuous work programme at differing stages of project development. Learning from this experience, we created real client projects to run precisely to the time scale of our teaching and incorporating clear objectives to be evaluated, on completion, by both parties. This is far more significant than giving a brief and allowing a company to review a number of concepts (free of charge) to add excitement to a course. The real client project is concerned with the integration of student and company so that both more fully understand each other's methods of working.

Firstly, the ground rules must be laid down. Students at level 3 were chosen as they possessed sufficient academic understanding of Industrial Design, had one work placement behind them and were beginning to study Design Methodology with their Part 1 curriculum. As the real client project would be undertaken by a small number of students, a selection process would need to be devised.

During the Summer of 1991, many companies, who had expressed a wish to work with students, were consulted. Those wishing to consider the real client project were given a presentation outlining Brunel's

course, its' objectives, the standard of student proficiency at the start of level 3 and the time scale. Each company was asked to prepare a short-list of project categories which would fulfil one of the following criteria:

- A product within their existing range to be redesigned (on a real or theoretical basis).
- A new product, approved by all internal parties to be put to either in-house or external design consultancy in the near future.
- A newly completed project carried out by in-house or external group but not implemented.

The single objective of the real client exercise was to complement the design Methodology element of the level 3 course with a case study project which endorsed the theoretical content through practical experience. It was therefore imperative that selected companies were fully conversant with Industrial design practice through one of the three project scenarios.

Subsequent meetings with companies dealt with the 5 month project timetable, short-listed projects, requirements of Brunel to the number of meetings, nature of their input and exposure to their procedures and data across departments. The project would be a simulated design exercise with real time participation by each client through a pre-planned programme. This lengthy first stage proved to be critical. It ensured that each participating company wished to contribute to our teaching programme, believed that they too would benefit from the project by re-evaluating their own decision making and product development procedures and that no real 'producable' artefact would necessarily result from the programme - if one did, this might well become the starting point for a potential work placement by one of the members of each design team.

Three companies were selected to participate in the project. This paper will concentrate on one case study. British Airways is a multi-million pound service organisation with a Design Service department co-ordinating the numerous design activities carried out by external design consultancies. The project we decided upon was a Cabin Divider. On short haul flights the economy 'Euro' traveller and the business 'club' traveller are separated by a Cabin Divider. This is a moveable partition, which separates the seat head to ceiling space. The Divider moves along the cabin to match the proportion of traveller types; thus allowing much greater flexibility in the booking of seats for each class and therefore maximum efficiency.

Six level 3 students were selected as the student design team. Interestingly, the selection of these individuals was not difficult; all were asked whether they would wish to participate at a briefing meeting of all real client projects and only a small group were sufficiently interested in the seemingly dull project (despite the exciting client). Short-listed candidates were interviewed by Brunel Design staff. Preference went to individuals who had failed to secure a placement previously. The two most capable design managers were then selected, two creative individuals and a BSc teaching student for his communication skills.

The project commenced in October 1991 with an intensive induction session at British Airways - the conflicting requirements by Marketing and Engineering Services and the objectives of Design Services, Purchasing and Brands Development. The team compiled a design specification and began to collate data on existing products.

As with any design project handled with external clients, the students' mix of creative ability, naivety and experience in different fields of study enabled them to generate new ideas. But the reality of the problem (as the students understood it) led them to see different priorities at once; no single area was isolated, no bias introduced for creative ease. From the outset, the team approached the project as a logistical, fact finding task more than simply a styling exercise. The team demanded much more client time from British Airways in their quest for information - BA, in turn, began to realise that this team was not typical of design consultancies previously employed.

The conventional approach of Industrial Design consultancies had been aesthetics based; responding to a brief generated by marketing services and focused clearly towards a single client viewpoint. The Brunel project was guided quite differently towards a divergent investigation of conflicting requirements throughout the client organisation. The mass of information from cabin crews, engineering, design, marketing and manufacturing personnel was then compared, assessed and ranked according to a precisely agreed design brief. Regular liaison with the client ensured that work progressed in a generally agreed manner and the project's concept stage presentation, to all involved parties, offered these considered concepts weighted to suit three internal strategies. The outcome of this meeting formed the brief for stage two.

The management of students, both in tactical and strategic planning of such a project, must not be

underestimated. Teams of undergraduate students not used to working in peer groups or with high management levels of an awe-inspiring real client, need clear instruction, close monitoring and specialist tuition in design methodologies. The real client is part of a simulated exercise, working with the mediating tutor as academic adviser plus experienced design consultant. The concept presentation was the first real opportunity to assess the student team's proficiency and to analyse the true response of the client.

Development of the project followed a positive appraisal of the concepts; one hybrid idea being preferred by all members of the client team. In this particular project, the client's understanding of the Divider problem was indeed re-clarified through the student's investigation. The second stage of such projects is convergent, based on evaluation and implementation of ideas and focused onto a summary documentation package. British Airways support of this stage was greater than the first; with more financial and technical assistance being given to a now more credible group of students. Mutual respect grew between the client and student teams.

The final stage is for both parties to evaluate their own contribution to the project and to realistically assess the benefits and drawbacks of the exercise. At the end of this Divider project, Brunel provided British Airways with a comprehensive report incorporating the brief, directions pursued, key decisions taken and a full specification of the recommended design. In accordance with the requirements of the level 3 academic course, the specification included research summaries, materials analysis, stress analysis of proposed structures, production data and model/prototype realisations. All this was converted into a final presentation, five months after the start of the project. This particular project was tangible and the outcome proved to have considerable commercial merit; a bonus for all concerned and more than had been expected during the planning stages. The report is now well circulated within the client company, the students have an experience unequalled within the course and a client reference to help them find future employment.

But what lessons are being learnt from real client projects? In the case of this particular project, four general educational aspects were addressed:

- New time management skills were inherited. The discipline of co-ordinating externally located personnel within many companies, in conjunction with planning strict project deadlines enabled the team to value and programme time-scales.
- The team's clarity of communication was improved. Aural and written presentation reached a new proficiency as each member of the team gained personal confidence and motivation to impress the client.
- All parties built a professional understanding of each other's skills. This is useful to the University in strengthening relationships with industry and using that link to gain better understanding of real expectations of the course. More significantly within the context of the real client project, respect for the client's quality of management, decision making and the complexities of operational procedures builds as students are exposed to the inner workings of real companies.
- The students learnt to work as a team. More than working together, each individual's skills were optimised and the group established specialist areas of expertise.

From the University's viewpoint, the project has many advantages. However, such projects only succeed through staff involvement beyond normal teaching commitment. Team management time is high, so too the monitoring of the project with key individuals within the client company. Mistakes are made, misunderstandings occur. Promises of support often lapse due to commercial priorities. These projects are undoubtedly their most effective when there is a project co-ordinator inside the company.

British Airways and Brunel have learnt from the exercise:

- The team of 6 was too large. Four is ideal.
- The project is an ideal vehicle to introduce new production technologies to students.
- Design and development specialists learn to interact with academic institutions and share their knowledge.
- The project allows the client company to better select candidates for future placement (and perhaps employment).
- The project enables the students to tackle real problems whilst still protected by the academic environment.
- The project must be clearly defined and all involved personnel fully briefed on the academic aims and objectives before the students are selected and briefed.

From the student's viewpoint, this project was a valuable experience. They were given total support by the client and, following a positive outcome to the project, were confident in their achievement. Through the work their individual strengths had

been highlighted and utilised but all students had missed the experience of their peers handling individual projects. This is a general criticism of group work but it is significant that teams tend not to improve their weaknesses or learn new practical skills when under pressure from client companies. This is now being positively addressed in current level 3 real client projects.

To date, five projects have been introduced to the level 3 course. The majority of individuals selected for the teams have not had a previous work placement; thus enabling them to experience client team work within the academic period.

Many lessons are being learnt and each new project is recorded and evaluated by staff, student teams and client staff co-ordinators.

The practical building of working links between industry and education forms an important part of level 3 design teaching within the present Industrial Design BSc course. It is hoped that projects with detail design engineering emphasis and human factors/marketing bias can be established over the next two years with companies wishing to work with students in the newly formed Industrial Design Engineering and Product Design BSc courses.