

INTELLECTUAL PROPERTY: AN ISSUE WHEN ENGAGING IN INDUSTRIAL COLLABORATIVE STUDENT PROJECTS?

Chris GLASSPOOL and Bryce DYER

School of Design, Engineering & Computing, Bournemouth University, UK

ABSTRACT

Many universities incorporate the use of industrial partners by conducting ‘live projects’ to help enhance the student learning experience. In the case of Bournemouth University, implementation of industrial engagement has traditionally been incorporated within the Product Design Bachelors degree over the course of its 19 year history. However, over the last 3 years, this aspect has been increased significantly. This paper builds on previous publications and explores case studies of industrial engagement further with the use of ‘live projects’ specifically investigating issue relating to intellectual property. These projects allow students to create products which are innovative yet highly sensitive to the needs of the commercial partner. Some qualitative evaluation is undertaken of both the student and of three industrial participants covering areas of IP. Ultimately, it is seen as a worthwhile activity and good practise for multidisciplinary design courses but that transparency and good planning is essential.

Keywords: Design, education, industrial partner

1 INTRODUCTION

Product Design (PD) is offered as an undergraduate level of study by many universities in the UK. Data from the Higher Education Statistic agency 2009 show that 51460 students were enrolled onto design courses at HE institutions in 2007/8. [1]

Throughout the academic year, the projects unit from the undergraduate product design course at Bournemouth University is delivered by 2 – 4 members of the design academics and runs for 4-5 weeks.

A typical project will present the students with a design brief and will require them to undertake some background research before they start to formulate initial ideas. Throughout the project, students typically have a focused lecture programme backed up by studio based tutorial sessions. To be able to complete the project, students are also required to work independently outside of these structured sessions.

Whilst the academic environment at university will inherently contain expertise of the highest level, collaborative third party input to undergraduate multidisciplinary design projects can often provide the benefits of specialised industrial expertise, anecdotal relativity, and a broader view of design. These are defined as ‘live projects’ within the confines of this paper and has been based upon a previous publication [2].

In the case of the target institution, implementation of many such live projects has increased steadily from their infrequent use since the degree’s inception in 1990 to the current provision of 3 annually in 2010/11. Each project is typically from a different industrial partner and often incorporating different deliverables or philosophy. This allows students to be constantly challenged and to avoid formulaic approaches to design and its process.

A design studio format was used as a base upon which all years of students worked either individually or in teams depending on the project brief requirements. Approximately 145 students derived from three academic years took part in the study.

The partnerships discussed in focus within this paper were between Bournemouth University and:

- Anglepoise (a designer and manufacturer of exclusive lighting products),

- Spinning Hat (a company specialising in product/gift design and manufacturer)
- Gelert (a camping and leisure product design and manufacturer).

Each project took place at varying points in the academic year and the deliverables (whilst varying in format) involved project submissions which encompass evidence from all aspects of the product design programme.

The aims of this research were:

- To analyse the experiences of the different year groups of students, the academic lecturing staff and collaborative industrial partners in relation to live project briefs.
- To compare and analyse the working relationships between BU and collaborative industrial partners with a focus on Intellectual Property (IP) ownership.

2 BACKGROUND

Among the various learning and teaching activities adopted or developed by university design courses is the 'project' approach. It allows students to not only gain a more in-depth and informed understanding of theories through self and group exploration, but also to apply, affirm or rebuke the knowledge or theories they have learned in related subjects also taught within a design programme of study [3].

Among the benefits of industry based design projects the following four items are given by Okudan, Mohammed and Ogot [4].

1. Because of their inherent layers of complexity students confront issues that stretch them beyond text books.
2. As these projects are done for a company that cares about the outcome students feel more motivated.
3. The project scope generally demands team work and, therefore, students learn project management.
4. These projects give students exposure to industry cultures and practices.

'Live' project briefs are a great opportunity for students to apply their creative skills to real industrial projects, where a route-to-market is established to commercialise product proposals if they meet the requirements of the industrial partner. Live projects not only provide a link between practicing engineers/designers and students, but also give students a deeper understanding for how they will use their discipline-specific knowledge and skills in industry [4]. Only through different kinds of collaboration can students know how to communicate with different work partners, discover their own strengths and weaknesses identify their roles and positions and improve themselves for their future career [3].

Some studies have been undertaken to gain a better understanding of the impact of industrial projects at an undergraduate level. Rohatynski's work [5] looked at the need for taking into account future industrial needs in the education of engineering designers. Additionally the impact of industrially based projects have shown how these motivate students to produce "highly professional work and helps them adapt to industry practice quickly" [6].

Students studying PD at Bournemouth University are given the opportunity to undertake a number of live projects over the four year period of the degree course.

Students studying PD at level H have longer time scales in which to work with industrial clients and produce products suitable for further development or production.

At the lower year levels (level I and level C students) designing for an industrial client could possibly be more problematic. Live projects might present a conflict of interest in the project direction, project timescales, realistic engineering and manufacturing consideration and project output. In some cases the initial introduction and development of a new client (collaborative industrial partner) relationship will be managed by university staff. The process of developing a suitable project brief can in this instance be directed and to a certain extent controlled by the staff member in accordance with the known requirements for project suitability, timescales and intended learning outcomes (ILO's).

The ownership of Intellectual Property in the project/product context has become increasingly topical with the progressive development of live projects and is determined on a project by project basis.

3 METHODOLOGY

To explore the aims of this study, several qualitative methods were undertaken, applied to several live design projects completed by the undergraduate Product Design students studying at Bournemouth University from the time period of 2007-2010.

The study examined three live design projects;

Project 1; Level I and C (first and second year students)

Project 2; Level I and C (first and second year students)

Project 3; Level H (final year students)

The relationship with the industrial partner of projects 1-3 began in 2007 culminating in subsequent projects 2008-10. It has used different operational details in project implementation whilst also using different briefs each year conceived between the academic institution and industrial partner.

In essence the projects were set by issuing a documented design brief, a period of time was issued (typically 4-5 weeks at level C and I, 32 weeks at Level H) and this then culminated with a formal presentation to a large audience in a formal venue.

The nature of the projects was:

Table 1. Annual Design Briefs

Year	Company	Design Project	IP arrangement
2008/2009	Spinning Hat	Novelty office products for a new ranges	Non formal
2009-2010	Anglepoise	Eco lighting, Furniture, Outdoor lighting	Non Formal
2009-2010	Gelert	Camping storage, Renewable energy device	Formal

The format of each project can be shown as:

Table 2. Project Format

Year	Company	Year Level	Project nature	Operation
2008/2009	Spinning Hat	I	Individual	4 weeks
2009-2010	Anglepoise	I&C	Group	5 weeks
2009-2010	Gelert	H	Individual	32 weeks

The case studies results were collected using focus groups, a sample of this selection was made from each year group and students were selected randomly. For level H projects, the sample is based solely on the number of students undertaking a live project. As this number is relatively low based on only 2-5 students opting for this typically each year, 1:1 interviews was the most appropriate data collection method.

To provide balance to the qualitative information, 1:1 Interviews were also conducted with the industrial partners of each project.

The level C and I students saw 6 focus group sessions conducted with 8 - 9 students per group, mixed male/female, 50 students in total. This was comprised of 3 Level I groups and 3 Level C groups. The focus group sessions lasted approximately 30 - 40 minutes.

12 open ended questions in these focus groups were developed to explore the students live project experiences at undergraduate level. The questions focused on the student personal experiences of the live projects, the student's knowledge of project IP ownership and asked the students to make comparisons between typical academic project briefs and the live industrial collaborative project briefs. Research consent forms were discussed, agreed and signed by all students involved prior to questioning. Some sample examples of the responses are illustrated below.

Example 1: Focus group 2, Level I students.

9 second year students (3 female, 6 male) from different project groups involved with the year 1 Anglepoise project and the year 2 Anglepoise & Spinning Hat projects.

Question: Do you think that live projects have benefits over other non live projects?

Example Answer 1:

'With the live projects it makes you raise your standards because you're working towards something where as with other projects we're thinking, just get the marks. When we did the Anglepoise project we suddenly realised that we're doing this for a reason. After the Anglepoise brief I sort of raised my game a bit'

Example Answer 2:

'I do think that having a company to design for is a lot better and it makes it much more interesting and having the possibility that the idea could go into production, that is such a good thing to look forward to rather than just another design for your portfolio, you become more professional'

Example 2;

1:1 interview, Level H student.

Question: Do you think that live projects have benefits over other non live projects?

Answer;

'Yes, I am very pleased to have attempted a commercial brief for my final year project; the experience has provided me with an insight into the world of industrial product design. I was very keen to finish the final year of the Product Design course having designed a product that there was initially a genuine need for.'

4 RESULTS & DISCUSSION

Through constructive coding and analysis of both the survey and interview responses, the research commonly raised the following feedback and issues:

- *Intellectual Property Issues.* There are possible complications relating to IP ownership which require negotiation and become more difficult to manage if student group project work is selected for further development and commercialisation.
- *Group Project Format.* Group working provides a team atmosphere but this can also dilute the value of an individual student. This means the design brief needs to be carefully considered based upon the project units work complement of the entire year. When group working is used sparingly, it is an occasionally viable solution to large cohort numbers which promote skills the student will likely discover upon employment.
- *Student Work Ownership.* Live brief group projects present a further level to the question of which students 'owns' what. The level of contribution from each individual may vary and it is sometimes difficult at the completion of a project to recall exactly where a 'good idea' came from or who within the group proposed it. The student has to understand that the result is the net worth of the entire group (even though the magnitude of the contribution may vary). This can cause upset and needs to be carefully monitored – especially when portfolios and professional employment is at stake or if the work develops further into IP and commercialisation.
- *Industrial Partner Value.* The qualitative data implied that the size of the company both physically (staff numbers, facilities etc) and in terms of annual production volume and financial turnover, does have an effect on attitudes towards university engagement. Anglepoise and Gelert were happy to engage with the university and formalise the relationship through legal documentation to implement an IP agreement. The companies wished to form a long term relationship and were able to engage on an annual basis without the risk of infringing on internal

company strategy and policy or disrupting company staff/company management. Spinning Hat was less keen to engage in formal IP agreements. The company's product sector is focused in the novelty gift market, resulting in a need for fast development times, low cost manufacturing/tooling and short product life expectancy (period of sale). The company has reasonable sales of product but due to the nature of its target sales sector and general low cost product portfolio, implementing IP or patent protection on individual products in this instance was not cost effective or beneficial.

- *Academic Staff IP.* By the very nature of the academic role, student's projects will inevitably have some design staff input. This input is often required at the front end of the concept generation process to assist students when starting a project, but can equally be required at any stage in the design process. If the staff have had a fundamental input into a project or offer a solution to a design problem, then legally, the resulting design IP is partly owned by that member of staff and the academic institution. The question of whether staff and BU can (or should) apply this interest should be defined prior to the project being undertaken or raised as soon as such an issue occurs. This policy might have deeper ethical implications and is possibly an area for further research.
- *Motivation.* Industrial collaboration is seen by the students as an exciting focus for the projects and students have commented that the prospect of having one of their designs 'put into production' adds new focus and improves the students work quality and output.
- *Bypassing IP conflict.* It might be possible to run live projects within the Product Design programme without undertaking or engaging in formal IP arrangements and agreements with the commercial partner. For example; Projects could be offered with the understanding that the 'best design' will win a prize offered by the participating company or offers of work placement/work experience within the company. These prizes would be seen by the students and university as reward for good design work, and by the company as closure and claim on IP. Alternatively a NDA (non disclosure agreement) could be used to offer some limited ownership protection at the start of the engagement, but full IP protection is likely to be needed if a product is developed for production.
- *Bi-products of collaboration.* By maintaining industrial links with companies, benefits were evident beyond that of the intended learning experiences for the students. Companies involved with design projects may seek other services from the university such contract research, short-courses and student placements. These can lead to revenue generation to both university and staff. Lastly, increasing the number of project disclosures, licenses, patents & registered designs filed is beneficial for the HE-BCI return which determines HEIF funding for the university.

In terms of success, at least one project from levels C or I has been investigated for further commercialisation with the IP ownership eventually resolved when considering the issues listed above. This process was managed by the lead project academic. In the case of level H live projects, the expectation of the design and prototype proved from the partner was higher but in all cases the student completed the body of work, to time and specification leaving the take-up of the successful project in the hand of the partner. In at least one case, this was progressed to a very successful commercialisation programme.

5 CONCLUSION

This research further reinforced that the student objectives and educational requirements at all levels of study can conflict with the commercial constraints of the industrial partner. To reduce the risks of a conflict of interest, transparency of process is important and that good planning and foresight of experienced design staff is essential. Some goodwill from both parties is initially required. However it is shown that problems can occur when claims to a design are disputed. Projects based on verbal agreements and honourable intentions do not require formal IP agreements and are likely to be easier to implement. A NDA (non disclosure agreement) is relatively easy to implement, but is limited in its

level of protection. Although a NDA could be used to offer some limited ownership protection, there is always a risk of companies claiming 'existing interest' (a similar project in development or within the company concept portfolio), or ignoring the NDA and using the presented concept work at a later date. From the authors 15 years of professional product development experience this does happen, can be difficult to detect, difficult to prove and claim financial compensation.

When developing a live project brief, the question should be asked (and asked early); does the requirement for the companies commercialisation of these products interfere with the University requirements of academic rigor, project ILO's and good design education? Ultimately, staff will have to decide whether they have the right experience to both negotiate and manage this level of initiative. The rewards are high for all involved but these are not without some risk.

Some useful lessons have been learnt from this research in terms of targeting suitable commercial partners. Obviously those organisations that are more focused on making a quick financial return and moving onto the next project (with less emphasis on intellectual property and putting the required paperwork in place) are more likely to lead to a student taking the risks with a 'go it alone' result (or use of the university to manage this process). Conversely it has been found that with larger companies, IP is taken more seriously and a more formal approach is expected.

The qualitative research in the case studies here show that live projects contain value as an exercise and are beneficial to the product design students both personally and professionally. Additionally, some evidence from the literature review shows the benefits of industrial collaboration projects academically.

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