

INDUSTRY MATTERS: MULTIDISCIPLINARY APPROACHES IN ACADEMIC PROGRAMMES

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ABSTRACT

Multidisciplinary approaches have been instrumental in furthering design learning, exemplifying live industrial design projects which flavour aspects of the product design curriculum, also contribute to economic well being. This aligns with current policy in the United Kingdom (UK) where higher education matters because it drives innovation and economic transformation. Higher education helps to produce economic growth, which in turn contributes to national prosperity. [1] This paper is an investigation into what happens in case study one, which is a government sponsored Knowledge Transfer Partnership compared to a more traditional live client undergraduate project in case study two; it describes the journey taken by students and the companies involved, discussing the relative fortunes of the outcomes. In the second case study the design brief was generated by a local toy distribution company, the prime objective being to support UK business through the development of new product lines. In particular, the paper will aim to investigate the multi and interdisciplinary aspects of this kind of live projects, and relates them to the design pedagogy of situated learning. Thus, the authors explored the impact on technical skill sets, the effectiveness of undergraduate (UG) learning informed by multiple university departments and with commercial clients setting the brief, exposing students to safety standards, resource management and the global market, manufacturing processes and locations associated with the design of toys and games. This interdisciplinary engagement is made visible through both the UK government funding schemes and local companies seeking university design input, within this context our role is as academic partners working with knowledge seeking companies and the proverbial ivory tower.

Keywords: Design, multidisciplinary, China, Thailand, knowledge transfer partnerships, prototype

1 INTRODUCTION

Design is at the core of engineering education, hence, this paper's main focus is case study research, based on live client engagement with manufacturers and suppliers. Here it will be within a product design degree programme that has grown out of a technical college and art school, this mirrors various other universities in the United Kingdom. The authors will compare and contrast how the live client approach has been instrumental in furthering the technical and commercial aspects of design learning. The case studies discussed within this paper will illustrate the importance of client engagement in design projects, live industrially sponsored design projects enhancing key aspects of undergraduate and postgraduate design curricula. The Design Department of the University of Northampton (TUoN) runs a number of courses in Three Dimensional Design and it has had numerous European industrial sponsors for Design projects over the years. The collaboration with the companies detailed in the case studies - BCE Distribution Ltd and Sue Ryder Care Ltd. - has offered undergraduates and their staff an insight into UK and Far Eastern manufacturing bases, and the management of international projects with challenges of fabrication, marketing and distribution. The University continues to investigate the mechanisms to bring new skill set into companies, and in so doing gets informed by the UK Knowledge Transfer Partnership (KTP) scheme and network. [2]

2 CONTEXT

2.1 Multi Disciplinarily Approaches

In this paper, multi disciplinarily approaches constitute transactional links of conversations among academics from a variety of disciplines including engineering, business (organizational behaviour,

strategy, marketing, and operations) and design management, ranging from design strategy, product design, brand identity, communications, interactive design, user experience, architecture, and environmental design.

2.2 Methodology

We capture the student learning experience through the academic assessment process and structured questionnaires; the impact of university engagement on industry has been measured with quantitative tools, in the KTP context evidenced by the companies' financial statements as part of mandatory final reports. It builds on a body of design research and practice, developing an understanding of the role of design and transactional exchange in new product development. The first case study is informed by a group of inter-related Knowledge Transfer Partnerships; their impact has been far reaching, benefitting individuals and organizations involved in ethical global trade, bringing value to the UK economy and generating collaborative partnerships opportunities internationally.

2.3 Background research

In the UK, driven by government policy, there is growing literature around engaging academia with industry, with emphasis on the creative industry, innovation and regeneration. Key reports such as Cox (2005), Leitch (2006) and Dyson (2010) [3] are outlining government strategy and they also explore the practical challenges, with examples of good practice of closing the gap between concept and commercialization. The Cox Review of Creativity in Business [4] identified the need for the United Kingdom (UK) to exploit its creative capabilities more fully, therefore, design and engineering education departments at British universities have been encouraged to reassess previous practice, arguably, especially learning and teaching strategies, placing an emphasis on industry briefs, industry models of engagement with companies, incentives and alumni networks. With the introduction of live client projects into the curriculum, the student's experience has been enhanced.

Correspondingly, the academic literature on university design-business engagement is evolving, here we refer to case study research on the 'Capstone' and business programmes at Aalto University [5], Howard University [6] and Karlsruhe University [7].

3 CASE STUDY 1 - KNOWLEDGE TRANSFER PARTNERSHIP

3.1 Engagement overview

Funded by UK Government and managed by the Technology Strategy Board (TSB), Knowledge Transfer Partnerships (KTP) involve the forming of a partnership between a company (here BCE Ltd) and an academic institute, the knowledge base partner in this case being The University of Northampton (TUoN), enabling rewarding and ongoing collaborations with businesses who require access to skills and expertise to help their company develop.

The Partnership also involves the employment of one or more recently qualified graduates (referred to within the scheme as associates) to facilitate this transfer of skills and expertise. The associate is supported (typically weekly meetings) by an academic supervisor, which provides academic direction to the Associate, who works within the company on a project of strategic importance, here packaging, exhibition design and table top games. A formal application was then made to the TSB, requesting project funding, based on the joint submission of a comprehensive proposal document. The application was successful in 2009, and recruitment of an associate was then undertaken; in terms of lead time from initial discussions with BCE to appointment approximately six months had elapsed, which is fairly typical for this scheme.

The use of the KTP initiative allowed, through the employment of a graduate designer – the associate, the embedding of a New Product Design (NPD) methodology within BCE Ltd. This is a strategy designed to exploit the "associates" creative skills and deliver an enhanced income stream. In terms of academic tangible benefits it was decided that during the implementation of the NPD methodology, and the creation of a new range of table top entertainment designs a parallel project would be run with the first year undergraduates enrolled on the University's Product Design course. The initial brief linked contextual studies and modelmaking by setting the task of developing a concept that enhanced family engagement – around a table.

The associate, whilst working for the Company remains technically an employee of the University, and is the beneficiary of considerable management training opportunities provided “free” by the TSB. The Associate is expected to enrol on and engage with a National Vocational Qualification (NVQ) qualification in Business Management, and could also include a higher degree programme, such as an MPhil and working with the design students whilst at the University.

Whilst the KTP project proposal defined the primary focus of the associate the work undertaken initially is that of Company familiarisation. The existing working practices being monitored leading to suggestions on how they could be improved. Following this period of familiarization a rapid movement to clarify technical specifications being supplied to the Chinese manufacturing companies was identified as being critical. Due to language, time and cultural differences the accurate transfer of information was identified as a problem in the existing process, and steps to improve communication were introduced and subsequently shared by the associate with the undergraduates, through lecture/workshop type of interaction.



Figure 1. BCE Table Sports Design and Folding Mechanism

3.2 University communications with industry

A typical engineering and design course in the UK is structured to allow for a project with a live client, such as a manufacturer in the region. First of all, a suitable partner company has to be identified, contacted and importantly be prepared to work on a jointly developed and appropriate project. There is also the challenge in achieving outcomes that fit the programme of learning (as defined by the curriculum, and the associated Module Specifications which describe the Award Map)

1. Determining what the students should expect to learn from the course, as well as the processes through which they will achieve these expectations.
2. Determining the expectations of the instructor in terms of not only the standards by which the instructor will grade the students, but also of student behaviour in class and with the community partners.
3. Identifying what the community partners should expect to contribute and expect to gain by agreeing to become involved with the course.

3.3 Life projects for undergraduate designers

The course the authors are involved in provides live projects to year One and Two undergraduate students. The studies lead to a Bachelor of Science underpinned by Manufacture and Engineering modules; aiming to develop from early-on professionalism, such as adhering to deadlines and identifying deliverables, team work, problem solving through investigation, experimentation and making.

Students thus develop problem-solving skills early on, used in future assignments, they benefit from a portfolio piece with a brand name, potentially seeing the winning design being further developed for manufacturing and marketable products. Students therefore gain early insights into the workings and constraints within in-house design.



Figure 2. Multi-Functional Table and Packaging

4 CASE STUDY 2 - LIVE CLIENT PROJECT WITH STUDENTS

The Sue Ryder Foundation is an organisation with charity status that raises money in many forms, one being the marketing of various children's toys. The Foundation was interested in exploring the potential of extending its children's toys range by producing a modern range of toys based on traditional toy concepts. From research undertaken students had to identify interesting toy concepts of the past. When undertaking the design they needed to consider child safety - design with the CE standard in mind, costs, materials, manufacturing processes and finishes and how these factors affect the retail selling price, product branding, packaging - how the toys will be shipped or boxed, and how the toy/s will be displayed in the context of the charity shops.

The general emphasis of the project/s was towards the generating and development of design ideas and concepts, that extend and push creative design abilities into an area outside normal sphere of thinking and operation, develop sketching abilities, by exploring and experimenting with sketching techniques, also to develop quality design development model making and final finished detailed model making abilities and skills.

Weekly presentations followed by all students of work undertaken during the week. The presentations are to help develop individual design and associated abilities and skills, to foster a peer group dynamic of personal learning and development, at the same time is an integral aspect of ongoing assessment. Therefore, all students are required to attend and contribute to discussion and feedback.

For each presentation students should select a student scribe to take on their behalf, notes of all feedback views expressed and advice given from tutors and students, a reference point for the next presentation, and as an ongoing record of project feedback advice and personal progress.

Both projects are demanding, therefore the following formal programme has been determined to assist in time-management for successful completion of the project, and is structured to enable students achieve the best possible outcome from their studies and efforts.

5 CONCLUSIONS

In conclusion the authors provide a discussion on the inter-connected nature of design, involving industry-academy collaboration in new product development.

The use of the KTP scheme illustrates some clear advantages to all parties involved:

- Undergraduates experience curriculum enrichment through live projects, exposure to business situation and a real understanding of lead times and deliverables.
- The production of models enhance manual skills, and a deepened understanding of 3D CAD and template generation, and possible undergraduate placement opportunities.
- The applied research undertaken by academic staff in the context of the KTP provides up to date understanding of current market trends, marketing strategies and manufacturing processes in a globalised market, which can be fed back into teaching.
- The industrial partner having had a new design capability embedded within the organisation, is presented with a wider set of strategic opportunities and increased Company profitability.
- The relationship between Business and Academic Institution is likely to be more than a short term gain, and provides networking opportunities to benefit both parties.

- The associate benefits in terms of experience, furthered academic and management competences leading to fast track career progression. The UK economy thus gains through increased Business turnover.

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