

# **INDUSTRIAL COLLABORATION AND ITS IMPORTANCE TO ENSURING CURRENCY IN DESIGN EDUCATION**

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## **ABSTRACT**

This paper presents case studies documenting how the area of Product Design within the School of Art & Design at the University of Salford has engaged in industrial collaboration on a national and international scale. A key approach utilised has been to centre these activities around the framework of Knowledge Transfer Partnerships [KTP] formally known as Teaching Company Schemes (TCS). For the sake of brevity we will refer to TCS as KTP from hereinon. This has enabled a number of fruitful relationships with appropriate industrial partners to be established.

In presenting these case studies the authors aim to establish a link between KTP programmes and how they can provide additional outcomes including staff placements, student placements and student projects. The benefits of these activities extend beyond the boundaries of the KTP programme and provide 'real world' input into the world of product design education. In turn, product design theories can be utilised as a valuable resource to support the activities of a KTP programme. This two-way dialogue is essential to successful KTP programmes.

Industrial partners benefit from academic input that complements their existing knowledge and skills. This input enables strategic viewpoints to be considered, developed and ultimately realised. New skills and methodologies are often introduced to the industry partner, applied and developed during the life of the project. Examples of this will be identified and discussed.

*Keywords: Product design, industry collaboration, KTP*

## **1 INDUSTRY NEED**

Lambert (2003) identifies that businesses are moving away from a system in which most of their research and development was done in their own organisations, to one in which they are actively seeking to collaborate with others in a new form of open innovation [1].

The Engineering Employers Federation (2003) noted the well-established link between research and development (R&D), innovation and productivity, concluding that 'there is ample evidence that the relative weakness of the UK's R&D spending over the last twenty years has played a measurable part in the country's disappointing productivity performance' [2]. The DTI's Strategy For Science Engineering And Technology (2002) identifies that innovation is required to close the gap in terms of R&D spend on the other G7 nations. As a share of Gross Domestic Product (GDP) overall spending upon R&D in the UK has declined steadily over the last 20 years. It states that 'In 1981, the UK's total spending on R&D as a proportion of GDP was higher than that of any other

member of the G7, with the exception of Germany. By 1999, it was lagging behind Germany, the US, France and Japan, and only just keeping pace with Canada' [3]. Porter (2003) concluded that current levels of UK innovation are insufficient to drive UK productivity growth and close the UK productivity gap versus key competitors [4]. Collaboration between industry and academia may be a way of increasing the UK's competitiveness however this relationship has its problems. Lambert (2003) notes that companies and universities are not natural partners: their cultures and their missions are different yet there is much to be gained from working together [5]. The authors contend that this may provide a mechanism of increasing the effectiveness of R&D activity yet there is still a need for both partners to overcome their differences and work more closely together. Merck (2003) provides evidence to support a link between business performance and collaboration with academic institutions. This may be the impetus required to develop these relationships [6].

## **2 ACADEMIC NEED**

The UK higher education sector is experiencing major change in terms of government funding and centralised support. The UK Government believes that there should be greater 'diversity of mission' among universities. Academic Enterprise is still comparatively new, with Treasury and Higher Education Funding Council for England (HEFCE) stating that third strand funding for enterprise activities will become a permanent part of Universities' portfolio in future [7].

The University of Salford has sought to embrace reach-out or enterprise as a core activity under the banner of Academic Enterprise (AE). AE's vision is to be a beacon of best practice for academically enterprising activity in Higher Education nationally. AE is one of the three strands of activity in the institution, each of which is interdependent:

- *Teaching and Learning* - which disseminates knowledge, with achievements recognised through degrees.
- *Research* - which develops new knowledge, from blue skies to practical Research & Development, with achievements recognised through the Research Assessment Exercise (RAE).
- *Academic Enterprise* - which innovatively applies knowledge and expertise for academic, commercial and social benefit, with achievements recognised through the Funding Council's annual surveys and metrics.

The establishment of the Academic Enterprise division at Salford in 1999, has seen an 'enterprising culture' develop within the institutions academic community. This has been a route to providing access to additional funding to support some of its activities. 'Academic Enterprise is the University's unique attempt to form entrepreneurial and socially inclusive partnerships with industry, the public sector and the community at large' (Williams 2004) [8].

The role of the Academic Enterprise division is to co-ordinate and manage the enterprise and commercial activities of the university. This role includes bid writing, co-ordinating with regional and European bodies such as the European Union and the North West Development Agency as well as filing for patents and protection of intellectual property.

As a core strand of activity AE operates differently from most Universities. The university has been commended by national and international bodies for its responsiveness to the needs of industry and the wider community. Powell (1999) sums up the University's AE activities as; having the Imagination to 'think out of the box',

providing the academic Reason to ground it properly, Daring to try something different and having the satisfaction and benefits of making Improvement [9].

Williams (2004) identified that AE is an expanding and developing area, and has considerable overlap with teaching and research within the School of Art & Design. Until recently these activities were not underpinned by a coherent strategy but developed in an adhoc manner by individuals, with both expertise and willingness to engage with industry and the community. Over recent years the level of these activities reached a point where the formulation of an AE strategy was not only required but also needed to formalise and sustain these activities. Currently over 30% of staff within the school are involved in AE activities [10].

With the formalisation of a dedicated AE strategy the School of Art & Design has been successful in developing a portfolio of enterprise activities that fully supports the needs of local and national industry and the wider community.

### **3 DESIGN EDUCATION AND INDUSTRY COLLABORATION**

Ulrich & Eppinger (2000) identify that many manufacturing organisations initially develop product development capabilities in an adhoc manner, with no overall strategy outlined. If we acknowledge that product development requires marketing, design and manufacturing input, it is often apparent that not all of these capabilities are evident with a particular organisation. The absence of one (or more) of these functions within an organisation, brought about by the relative decrease in R&D spend over the last 20 years, has resulted in the reduced effectiveness within the development process. Organisations may be able to identify their deficiencies within certain areas but do not necessarily understand the implications of this 'knowledge gap' [11].

The economic success of manufacturing organisations depends upon their ability to identify the needs of customers and to quickly create products that meet these needs and can be produced at low cost. Kotler (2000) [12] and Bruce & Bessant (2002) [13] state that achieving these goals is not solely a marketing problem, nor is it solely a design problem or a manufacturing problem; it is a product development problem involving all areas of the business

Companies experiencing rapid growth are more likely to value design as a strategic business tool, use it in important areas of their performance and recognise its importance on their performance. Research provides evidence of the relationship between business success and the use of design and innovation. 74% of rapidly growing companies say design has become more important to them over the last ten years in maintaining their competitive edge. 18% of rapidly growing businesses use designers at all stages of the research and development process - double the number of businesses overall [14].

### **4 CASE STUDIES**

KTP have provided a suitable framework for the School of Art & Design to support organisations in new product development; from user, market and sector research, through concept, design and manufacturing development, to product launch.

At the heart of each KTP is one or more associate. An associate is a high-calibre graduate [that is to say a student who has achieved a degree mark over 60% or commonly referred to as a 2.1 award] who is recruited to work in a business on a project that is central to its strategic development. The associate is supported by members of academic staff and carries out a programme of work designed to facilitate transfer of knowledge, skills and technology central to the company's business. For the company,

this has the benefits of improved performance, as measured by profitability and competitiveness.

#### **4.1 Cannon Hygiene Limited, Morecambe, Lancashire**

For over 50 years Cannon Hygiene has been providing single or multiple service solutions in washroom hygiene, pest control, horticulture, laundry and consumable products for a range of companies; from small private businesses through to blue chip multi-site national contracts.

Collaboration between Cannon Hygiene and Salford started in 2000 with a research and concept design project undertaken by undergraduate product design students. The project aimed to identify future trends and desires anticipated within the washroom. The project theme - The Washroom of the Future – was broad in its design allowing a multifaceted approach to be adopted.

The project culminated in a formal presentation to senior staff within the organisation where research activities and findings, market sector analysis, concept designs and development and future scenarios were discussed. The presence of senior staff and their feedback was a key indicator to the students that there was ‘buy in’ from Cannon. Various concepts and approaches were identified as valuable to immediate and future developments within Cannon.

The success of this initial research and design project had demonstrated to Cannon that further collaboration with Salford was worthy of consideration. These discussions resulted in the development of a 3-year KTP. Its overall aim is ‘To improve company competitiveness through the development and installation of new design management capabilities to produce innovative washroom products’.

Commencing in September 2002 the KTP programme has resulted in the achievement of a number of key milestones. These include:

- Review the company’s existing brand image, design and marketing activities, customer base and competitive situation, design management processes, creativity and innovation levels
- Development and implementation of a brand strategy
- Development and implementation of a sustainable internal design management process
- Design and manufacture of a new product range (ongoing)

The establishment of a sustainable internal design management function is central to the long term success of the partnership and as such was the key theme of the scheme, supporting not only new product development but undertaking a broader remit within Cannon. There have been a number of spin off’s for the university since the scheme commenced with these providing added value to the relationship. These include; live projects undertaken by students under the supervision of the associate and university staff; staff placements at Cannon Hygiene providing additional input outside of the remit of the scheme; up to date industry insight for both staff and students; and the opportunity for student placements at the company.

Cannon Hygiene have in addition to the remit of the KTP; developed a greater understanding of design in a business context; undertaken various market research approaches; been able to develop a sustainable design strategy; and implement documentation for NPD that supports each design undertaking.

The scheme has not been without challenges to overcome. Between the submission of the KTP programme and its commencement, Cannon undertook the acquisition of related companies, increasing its turnover from £60M to £90M. This required the focus

of the KTP programme to be revisited as elements of the scheme were not as relevant, but additional issues would need to be addressed. Considerable effort was required to revise the programme providing the proposed plan of work with greater clarity of purpose and consequently effectiveness.

#### **4.2 Deva Tap Limited, Leigh, Lancashire**

Deva Tap Limited was established in 1991 specialises in the import and reselling of taps, showers and associated kitchen/bathroom brassware for the UK market. It has specialised in reselling product offerings from off-shore manufacturers located predominantly in China, India, Portugal and Italy. Its principal customers comprise of builder's merchants and DIY outlets, including Jewson-Graham, Wickes, Travis Perkins and The Plumb Centre. Deva Tap had no experience of internal product design and development.

The School of Art & Design was contacted via the university's Academic Enterprise division in late 2001. After initial discussions with senior representatives of the company and academics a KTP was established. Commencing in October 2002, its aim is 'The establishment of new product development and manufacturing management capabilities to produce innovative products'.

The KTP scheme was established to enable Deva Tap to undertake the design and development of a new prestige range of taps and accessories, from initial market research, through product design, tool design and supplier liaison, to product launch. It is intended that this will provide the company with an innovative product range, which will be unique in the market and establish the company as a market leader and as such will add significant value and credibility to their operation.

It was intended that the KTP would provide the company with the design capability to market research, develop, liaise on the manufacture of, and launch a range of premium washroom products that also have the flexibility to be adapted for national and international markets. This is assisting Deva to establish a strong brand identity within its sector, and allow it to further diversify its ranges into related accessories, generating significant competitive advantage and sustaining business growth and profitability.

Since the KTP commenced in 2002, major milestones achieved include:

- Review of company's present position (market sector report, material and manufacturing audit, competitor analysis)
- Assess New Product Development opportunities
- Development of a New Product Development strategy
- Implement strategy, design and manufacture of a new product range through to launch (ongoing)

Deva had previously not incurred neither the costs of prototype manufacturing nor the risk of manufacturing tooling. This resulted in limited understanding of such issues within the organisation and was an area that required clarification to develop understanding. This has proved to be an area that caused confusion. The company had previously underestimated the time actually taken to design and develop any product. In actually undertaking the research, design and development of its own range of products, this understanding has been greatly enhanced. The level of understanding has been disseminated to a number of personnel within the organisation.

As with the previous case study, there have been a number of spin off's for the university since the scheme commenced. Again these have been instrumental to the 'adoption' of the scheme and its associated activities. They include: live projects undertaken by students under the supervision of the associate and university staff; the

generation of project areas for students to undertake as part of a major project; staff placements at Deva Tap providing additional input beyond of the remit of the scheme; exposure to up to date industry practices for both staff and students; and the potential for further collaboration beyond the remit of the scheme.

During the period of the KTP, Deva Tap have also; developed a greater understanding of product design practices; applied advanced market research and validation techniques to support strategic decisions; a greater understanding of the complexity of product development and prototyping activities; and committed to a long-term development strategy.

## **5 CONCLUDING REMARKS**

The modes of collaboration discussed within this paper provide evidence that there is a mechanism for organisations to with academia in order to innovate and increase their competitive advantage. These relationships have allowed businesses to tap into the wealth of knowledge within the UK's academic institutions. Lambert (2003) states that most UK businesses have no experience of working with universities, and therefore no idea of the benefits that can arise from collaborating with them. This is an area that must be addressed if these partnerships are going to develop and foster [15].

There is a need for industry to engage with academia to bridge the knowledge gap that has been created as organisations have reduced the level of in-house investment in R&D, something that has been in decline for over two decades. This knowledge gap needs to be replenished in order for organisations to develop and increase competitive advantage.

KTP programmes are an important, but by no means perfect mechanism, to achieve the transfer of knowledge from academia to industry. Importantly though, this transfer needs to be a two-way activity - from the industrial partner to the academic institution and - from the academic institution to the industrial partner.

The case studies highlight that there is also a need from academia to forge successful partnerships with industry. Academia, in particular those engaged with design, benefit from industrial collaborations that provide:

- Real world experience for staff
- Real world experience for students
- A framework for live projects that provide an insight to professional design practice
- Teaching material
- Research material
- Potential areas for further collaboration

The benefits to the academic curriculum and student experience from engagement with industry cannot easily be measured. There is evidence that students highly valued the experience of working upon what they see as 'real' design projects. Increased levels of motivation were evident as the students experienced a novel framework. It is noted that this cannot be the norm and would not work so effectively is this was so.

Industry collaboration is central to ensuring currency within academic institutions - in particular in applied subject areas such as product design. The arms of academia and industry must continue to reach out to embrace each other even when this relationship is complex and demanding.

Lambert (2003) states that there is still much work to be done in relation to industrial collaboration in Universities. This is evident across not only subject disciplines, but also institutions. They need to become better at identifying their areas of competitive

strength in research and ensure that these strengths are communicated to appropriate stakeholders in industry [16].

The case studies presented have shown that the School of Art & Design can collaborate within a mutually rewarding partnership with industry, building on its strengths, successes, experience and research expertise. Much of the theories discussed within this paper are being reviewed and developed and are by no means conclusive. There is still much work to be done to produce cross discipline guidelines that are appropriate to all. It is intended that this will be continued and the theories within this paper developed.

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