Enhancing Enterprise in Undergraduate Design Major Projects

A practical research study supported by the Higher Education Entrepreneurship Group (HEEG) in collaboration with Kingston University, Brunel University and Designplus

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Introduction

4,500 final year undergraduate design students in the London region and nationally in the UK, up to 20,000 students (HESA, 2010) typically undertake a Major Project which will include aspects of work which could be enhanced through a focus on entrepreneurship factors. Designplus is an initiative within the Westfocus consortia of Universities which promotes design based collaborations with business. It has a track record since 2004 of facilitating links between students and businesses as a basis for Major Projects. This report details a project led by Designplus, part funded by the Higher Education Entrepreneurship Group (HEEG), involving staff from Kingston and Brunel Universities, leading to the development of teaching materials, case studies and a symposium for design teaching staff in the South East, all based on enhancing entrepreneurship in design Major Projects. Design students, staff and collaborating businesses are all intended beneficiaries of the work.

Considerable numbers of undergraduate design students' final year major projects include aspects which could be enhanced through greater focus on entrepreneurship factors, such as Intellectual Property protection, trends analysis, market forecasting, return on investment planning, route to market strategies or individual enterprise qualities. Whilst these factors may well be covered to an extent within existing practice, there are well documented imperatives within the design profession to enhance student's awareness and understanding of these factors (eg Cox Review, 2006, HEA-ADM Creating Entrepreneurship, 2007 and the Design Council/Creative & Cultural Skills Design Blueprint, 2008). Design major projects also represent a vast IP asset, which is currently relatively poorly exploited. Simultaneously; based on many of the same contextual factors, Universities are being encouraged through various initiatives to develop links with business. Designplus has provided a highly relevant infrastructure to support the project through an established track record of initiating collaborative student major projects with industry partners.

The overall aim of the project is to:

Enhance current and future final year undergraduate design students' skills knowledge and understanding of enterprise factors within their major projects.

1.1   Summary Project Objectives

Objectives	Activities	Intended Outcome
Identify practical potential for enhancing enterprise factors within current Design Major Projects	Workshops with Brunel and Kingston design and enterprise staff currently supporting Major Projects and other related work	A practical analysis & review of the current situation with a summary of relevant factors and opportunities
Develop new enterprise teaching materials focused on the needs and learning styles of design students	New teaching materials and project activities developed in conjunction with design staff	Enhanced delivery of entrepreneurship content within Brunel and Kingston design courses through teaching materials specifically tailored to Design students' learning styles, needs and opportunities.
Production of case studies of Major Projects as a basis for wider dissemination and exploration of the benefits of an enhanced enterprise focus within Major Projects	Production of 15 Major Project case studies for dissemination through various channels	An ongoing resource to communicate and promote the benefits to a wider audience
To explore the issues and benefits amongst a wider audience of design academics	An event attended by 75 educators and representatives of Higher Education and industry	Adoption of the teaching materials and case study formats within broader practice amongst the many specialist HE Design Schools and courses in the SE region

Table 1: Summary project objectives

1.2   Enterprise versus Entrepreneurship

The National Enterprise Educators group defines *entrepreneurship* as the application of skills in the context of setting up new ventures. Whilst *enterprise* is defined as a broader set of personal qualities which would be part of entrepreneurship (Enterprise Educators UK, 2010). Enterprise Educators are aiming to clarify the terms. In doing so they are acknowledging that there can be confusion about precise definition and scope of the terms. In the early workshop stages of the study it became clear that a narrow definition of *entrepreneurship* based on the concept of setting up a new business and associated knowledge and skills, can be a barrier, or unnecessary distraction from primary concerns. For example with students who feel that they are 'never' going to be personally involved with starting a business. Or with design teaching staff who are understandably protective of 'their' subject specialism. The Enterprise Educators definition of Entrepreneurship is broader in that it refers to 'new ventures' and virtually any design project could be considered a new venture. But pre-conceptions of entrepreneurship can be firmly embedded. At a relatively early stage in the study it was decided to side-step any negative connotations or difficulties over defining the scope of entrepreneurship by talking in terms of *enterprise*. In this case the term *enterprise* encompasses the Enterprise Educators concept of enterprising personal qualities. But it is also used to include a broader range of factors. For example market context or economic factors relating to specific projects and route to market factors which are familiar within the field of New Product Development. This approach therefore integrates the concept of entrepreneurship into the complete range of

economic and enterprise factors which might apply to design projects. Thus aiming to avoid some of the perceptual barriers discovered during the project workshops. Table 2 summarises the main categories of economic and enterprise factors which would be included within this definition of enterprise.

Enterprise Factor	Indicative sub categories and areas of consideration within Major Projects
Market Context	Macro economics relevant to the project contexts Competitors and competitive products and services Stakeholders Trend forecasting and analysis
Route to Market	New Product Development and business planning Risk and barrier analysis Intellectual Property Marketing planning
Individual Enterprise	Project planning Communications Enterprising qualities (vision, initiative, leadership, drive etc)

Table 2: Summary categorisation of enterprise factors

The Design, Enterprise and Higher Education context

There are strong overlapping interests amongst the design community, design higher education, business, and various government departments and agencies seeking to develop individual, professional and national economic success and relevance in a rapidly changing global context. A useful way to review this context is through the many Government department and agency reports that have followed the Cox and Sainsbury reports' exploration of the UK's innovation and design capabilities within the global economy (Sainsbury, 2003 & Cox, 2005) Links with business are a historically strong element of design education. Building on the themes of the Cox and Sainsbury reports, the Design Council partnership with the Creative and Cultural Skills Council has formed the Design Skills advisory panel to investigate and make recommendations for improving the competitiveness of the UK design community. Three main recommendations for Higher Education are made in the panel's initial report: developing a network of visiting practitioners to connect education with professional practice; developing multi-disciplinary practice; and development of web-based career and course information (Design Council/Creative & Cultural Skills, 2008). In parallel with these initiatives, the Higher Education Funding Council (HEFCE) and it's research councils have a number of initiatives that directly target the themes of multi-disciplinary practice and links with industry and innovation, such as the Higher Education Innovation Fund or the 'Designing for the 21st Century' initiative funded by the Engineering & Physical Sciences Research Council and the Arts & Humanities Research Council. The theme of multi-disciplinary working as a basis for collaborations between business, technology and design subjects is a strong trend (Design Council/HEFCE, 2005), with high profile examples such as Design-London, the collaboration between the Royal College of Art and Imperial College, or C4D, the Cranfield-University of the Arts £3.5m HEFCE funded initiative launched in late 2007.

Many of these recent initiatives within the Design HE sector are creating new activities alongside well established core activities of courses and research. However it is also recognised that there is a need for greater emphasis on enterprise factors within established teaching and learning (HEA-ADM & NESTA, 2007). The HEA-ADM & NESTA report (op cit) into entrepreneurship education in the creative industries identifies that whilst there is support for initiatives to enhance entrepreneurship, it often remains a secondary consideration and is restrained by stereotypical narrow perceptions of the subject. The report goes on to describe the following (summarised) features of an emerging model of entrepreneurship education in creative subjects:

- Identifiable enterprise modules or components within courses
- This content should be integrated into the project based - deep learning approach of creative education
- Enterprise attitudes, skills and behaviour are effectively developed through engagement with industry

As a key component of most undergraduate design degrees in the UK, the Major project, the focus of this study, is an ideal vehicle for exploring in detail how the contextual factors identified and explored in the literature can be enhanced in practical terms.

2.1 Symposium views

'To explore the issues and benefits amongst a wider audience of design academics' - one of the objectives of the study - a project symposium held on 15 September 2010, and attended by 75 delegates was based around responding to the question:

'With 55,000 undergraduates currently studying design in the UK, and most of them likely to undertake a Final Design Project, how can an enterprising approach be integrated into this process?'

With speakers from business, design, education and policy contexts, and hands-on workshop sessions, this event aimed to develop practical steps to more effectively connect the UK's amazing young creative talent to the universal agenda of improving our economy and people's lives through successful products, services and organisations.

The event was attended by Design tutors and Heads of Design from Higher Education, design bodies and policy makers, and design consultancy businesses with an interest in shaping future graduates. Keynote speakers contextualised the debate. The speakers were selected to represent the significant perspectives of; Design Higher Education, professional bodies, the design consultancy sector and business in general. Their views summarised are as follows:

Anne Boddington, Dean of the Faculty of Arts at the University of Brighton, and an elected member of the executive for the Council for Higher Education in Art & Design (CHEAD), challenged design educators to behave entrepreneurially – like designers – and to do more to *design* a learning context where risk taking fits alongside a scholarly dialogue. She questioned whether learning outcomes are the best way to describe what is learned as well as what it is produced, proposing that linear models of production are as outdated in education as they are in innovation.

David Worthington, Chairman of the Lloyd Northover Group at AIM listed Media Square plc and Chair of the UK Design Alliance, delivered three warnings. Firstly, don't worry about the design industry's criticism that education creates too many graduates – this simply creates more choice for the industry. Secondly, don't get caught up in the "Emperor's New Clothes" of Enterprise and Entrepreneurship. This wasn't to denigrate entrepreneurship as a quality – he maintained that designers are innately entrepreneurial in the sense that they imagine things which don't exist today, and negotiate towards their existence. Thirdly, he implored design educators to keep it simple.

He also outlined the Design Alliance's plans to maintain the UK Design Industry's skills base, maintaining its position at the top of the global marketplace. These involve increasing numbers of secondary schools with a Design Mark, suggesting links with local companies to support this plan. Also, implementing a visiting lecturer's programme in Higher Education whereby lecturers themselves visit industry partners, following a structured development programme. Thirdly, the Design Alliance is creating an alliance of regional organisations, providing a space where, for example, a university could establish links with its local market.

Gus Desbarats, Founder and Chairman of The Alloy and Chair of the BDI, asked us as design educators to focus on preparing graduates for the realities of the workplace. His assertion that designers are continuously involved in entrepreneurial activity echoed David Worthington's stance. Gus highlighted that designers are, in their practice, investing other people's money. To do this successfully, he argued, designers need to emerge from their education with empathy and the ability to turn this deep empathy into practical action, alongside risk awareness, persuasive negotiation skills, attention to detail, self- discipline and a sense of purpose.

He urged a move away from too much focus on objects, instead calling for attention to people's interaction with the objects. Finally, a broadening of graduates' understanding of their career options – enabling them to think entrepreneurially and take up the opportunities available, both within applied design and beyond.

David Riley, co-founder of the Mandeville Recruitment Group and Brunel Entrepreneur-in-Residence, also emphasised the need to better prepare the people who emerge from design education, offering some practical suggestions to which, while they may or may not elicit more market-ready products from major projects, could produce more market-ready people. His suggestions to inject commercialism, entrepreneurship and market awareness into Major Projects included allocating a proportion of marks for market connections, feeling that, from an entrepreneurial point of view, allocating at least 50% of the marks to the market process wouldn't be overstating its importance. Also, reinforcing Ann Boddington's message, avoid penalising students for taking risks, as long as the student can evaluate the successful, or otherwise, outcome of this risk. Or perhaps injecting some market competition into marking – for example, apportioning 99% of a student's marks to the normal criteria, and adding the remaining mark to a pool representing market competition which can then be competed for amongst the whole cohort. Company sponsored prizes, perhaps with the company's sponsorship input purely in kind, as expertise, for example.

He urged universities to consider branching out and taking the lead in such moves, rather than falling into 'mackerel thinking', waiting for the whole system to shift its direction.

Image 1 Key note speakers: Anne Boddington, David Worthington, Gus Desbarats and David Riley

Six graduates from Brunel and Kingston Universities presented their major projects, with insights gained from completing their projects, and having graduated, with the opportunity to reflect on the process. The approaches they had taken were hugely varied, as were the aims of their projects, from Natalie King's serendipitous nationwide publicity resulting in a potential commercial roll-out of her Tulipe flowerpot design to Michele Camerlengo's ongoing development and strong ambition to go into production with his ObliqO urban vehicle. (also ref case studies in the appendices and the review in section 3.3)

The workshop session produced a host of suggestions and ideas, including some themes such as:

External contacts – Nurture and expand industry links, invite external people to contribute to assessment, award schemes, live projects etc. Also, inviting new and past graduates to speak to students. Developing understanding and awareness of company structures, how designers can fit into this. Perhaps adding the *requirement* for projects to have an external client. Developing contacts in non-traditional businesses.

Cross-university, interdepartmental links - Students to be encouraged to take cross-disciplinary modules, other faculties to contribute to setting briefs. Encouraging multidisciplinary teams of academics.

Reconsider marking criteria – e.g. acknowledge commercial marketing considerations. More flexibility, rewarding appropriate risk taking, less "tick-box" marking

Support development of effective communication, persuasion and negotiation skills

Linked-in Group - The debate continues at a an eponymously named group on the linked-in site – Enhancing Enterprise in Design Major Projects (www.linkedin.com)

2.2   Key points and founding principles for the study

Drawing together and building on the background context, including the findings and recommendations of the various reports on entrepreneurship and creative education in the UK, together with the professional opinions and anecdotal experiences of the main participants of this study, a number of underlying key points and founding principles have been established

Enterprise encompasses entrepreneurship
For many people unfamiliar with more detailed debate around *entrepreneurship*, the term can be unhelpful, suggesting a narrow focus on establishing start up businesses. Alternatively, using the term *enterprise* encompasses a broader range of factors and side-steps any negative preconceptions around *entrepreneurship*.

Design Major Projects are an undervalued asset
A major project may easily represent over 400 hours of an individual's input. This experience, as well as any tangible deliverables from the project, however they may be judged, are highly significant to the design student's future. The intellectual property within the work may well have actual value, but more generally, we should consider the whole experience and outputs as an asset from which more value can be derived.

Integrated, project based work produces deep learning
Practical design projects are core to the success of design education, a pedagogic model with proven validity which should remain as the basis for redesigning design education

Build relationships with industry
A significant theme throughout the many reports into entrepreneurship education and the development of the creative industries is the importance of collaboration with industry. This requires more significant re-alignment and integration of resources and expertise, together with the development of experience through practical activity.

Reviews of existing practice at Kingston and Brunel

The key statistics for the Major Projects undertaken by Brunel and Kingston Product/Industrial Design/Furniture students are indicated in Table 3 below. The teaching, students, external input and information related to these courses form the basis for this study. In both cases (Kingston and Brunel), and typical of the Design HE sector, the Major Project is presented as the culmination of the students' undergraduate education and a vehicle for individual and future career interests. It forms a significant element (up to about 20%) of the students' final degree assessment and grades. At both establishments students are encouraged to develop their own topic ideas. This might start to take place prior to the final year and, or, during a structured process during the early part of the final year. It is useful to consider the Major project in terms of a time line and an input-process-output matrix with the main factors of information, teaching, students and external input (ref Table 4). Within this matrix there are universal aspects of delivery (shaded in darker blue and bold text). All of the elements within the matrix can be considered to have the potential for enhancement in relation to enterprise factors.

Course	Population	Module details	Related modules
Kingston University Faculty of Art, Design and Architecture **Product and Furniture Design BA** **Product Design BSc**	Combined Circ 40	**Major Project** (30 credits, 300 study hours)	Professional Portfolio (30 credits)
Brunel University School of Engineering and Design **Industrial Design & Technology BA** **Product Design BSc** **Product Design Engineering BSc**	Combined Circ 100	**Major Project** (40 credits, 400 study hours)	Innovation Management (20 credits)

Table 3 Kingston and Brunel Major Project statistics

In order to explore the potential for enhancing the enterprise aspects of the various elements of Major Projects a series of activities were undertaken with the aim of providing a number of analytical perspectives and related practical proposals for development. Workshops were held with staff at Brunel and Kingston: in a joint event, with Major Project tutors at Brunel, and with staff involved with enterprise initiatives at Brunel. A second element of research looked at the information and documentation which underpins the Major Project Modules at Kingston and Brunel. Thirdly, the main practical output of the major projects, the design projects themselves, were analysed. This was done through a combination of a quantitative overview of all the projects from Kingston and Brunel for the years 2008/9 and 2009/10, and more specifically by selecting 8 case studies from Kingston and 7 from Brunel, which, in the opinions of the respective course tutors, represented relevant enterprise characteristics.

	Pre session (input)	Term time (process)	Completion (output)	Next steps
Information	**Module documentation**	**Teaching materials**	**Assessment** **Exhibition & communication materials**	Communication materials
Teaching	**Planning**	**Tutorials and Lectures**	**Assessment**	Supporting students/projects
Students	Considering major project topics	**Project work**	**Exhibiting**	**Employment / continuing in academia**
External input	Initiating collaborations	Reviews	**Visiting exhibitions**	**Employing students**

Table 4 Matrix of key major project elements

3.1   Staff workshops

An initial joint workshop with Design staff from Kingston and Brunel was held in March 2010. Once an overview of respective pedagogic practice had been established discussions were based around the students' major project journey. This was a basis for exploring **practical potential for enhancing entrepreneurship factors within current Design Major Projects.** From this discussion three themes were identified as a starting point for developing teaching materials and approaches which respond to the contexts at Brunel and Kingston. The themes relate to the sequence of the major project journey. *Design thinking and T shaped designers* encompasses the issues and opportunities relating to forming strong, well informed individual major project starting points. *Route to market* targets the opportunities for synergy and enhanced practice in delivering entrepreneurship knowledge and experience. *Rewarding enterprise and risk* targets assessment strategies and other direct action to encourage enterprising behaviour. Table 5 summaries each theme in terms of an brief description of the issue and opportunity, the possibilities for deliverables and a note of the practical course delivery actions which have taken place.

Theme	Note
Design thinking and T shaped designers	**Better informed project starting points – clearer identification of enterprise element** Potentially applies from earlier-on during courses. For Major Projects, this may involve aspects of Kingston's 'personal manifesto' and quick contextual explorations to both stretch and map potential Major Project starting points within an enterprise framework.
	Deliverable possibilities A briefing lecture, mini project/task and related analysis 'tool' to help explore and evaluate personal interests and ways to maximise 'value' from potential project contexts.
	Action Enterprise element added to briefing day for the Brunel 2010/11 final year design cohort

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Route to market	**Entrepreneurship knowledge and experience**
	Linking content between the Brunel Innovation Management module, the Commercialisation Office and Major Project.
	Encouraging specific work within Major Projects (all students or self-selecting students) to follow up and deepen knowledge and experience.
	Deliverable possibilities
	Lectures/Lecture notes making specific links between the above aspects.
	A specific requirement/additional detail for Major Project development activity and reports.
	Action
	Enterprise and Route to Market assignment incorporated into the Brunel parallel module 'Innovation Management' for the 2010/11 cohort
Rewarding Enterprise and Risk	**Assessment strategies and other direct action to encourage enterprising behaviour.**
	Reviewing Brunel Major Project assessment and other related modules to explore potential for adjusting learning outcomes and assessment criteria.
	Deliverable possibilities
	Amendments to module documentation for review in June/July BoS (Brunel Board of Studies).
	Content for staff meetings/September symposium to highlight issues and opportunities.
	Actions
	Ref above; Innovation management module assignment integrated with Major Project

Table 5 Summary themes and outcomes from joint Kingston and Brunel design staff workshop

In May 2010 a second workshop took place with Brunel Design staff to explore in more detail how enterprise factors might be enhanced within the Brunel Design Major project module. From this discussion eight proposals were identified (ref Table 6). Subsequently staff were invited to prioritise these proposals and a number have subsequently been implemented during the initial stages of the 2010/11 academic year. Actions are also noted on the table.

Proposal	Note
INSPIRATIONAL ENTERPRISE BRIEFING to the students with an external speaker	This could emphasis the value of:
	Links with external organisations
	Risk taking
	Broader and deeper work
	More emphasis on creativity and prototyping
Make an **ENTERPRISE COMPONENT** of major projects a requirement	Currently there are no written requirements for any particular enterprise focus. The requirement could be soft: part of briefings and tutor recommendations, or hard: part of the written recommendations and/or assessment criteria
	Action
	Enterprise and Route to Market assignment incorporated into the Brunel parallel

	module 'Innovation Management' for the 2010/11 cohort
Increase numbers of **EXTERNAL SPEAKERS**	Particularly speakers with a clear enterprise message. This could happen during Fresher's week. Speakers could be selected to represent a range of relevant contemporary issues eg social enterprise as well as conventional entrepreneurship. Also ref following proposal
Run a number of **INDUSTRY REVIEW EVENTS**	These might have a more informal approach – encouraging students' ambition and creativity. These might also work as one day warm-up or ice breaker projects. Also note potential for involving other subject areas from the university in these sessions – Occupational Therapy and Business School were mentioned
	Action: A series of three Industry review events were held in November 2010 providing every Brunel Major Project student with the opportunity to receive a number of external views on their projects and network with figures from industry
Extra support for making **PROJECT LINKS WITH BUSINESS**	Students can lack confidence in taking initiative and forging links with external organisations. This could be a specific aspect of how 1st and 2nd supervisors may support their students. Likewise there may be additional value from the 2nd supervisor taking an early interest in projects. Also note that Designplus has managing an ECIF funded project to encourage and provide additional support for collaborative Major Projects.
	Action: With additional funding from the HEFCE Economic Challenge Investment Fund a collaborative project model was developed and 25 collaborative projects with industry have been established for 2010/11 – 25% of the total number of major projects
Additional encouragement and support for **PEER LEARNING SESSIONS**	Some of the Friday evening sessions run by PT have worked well as peer learning sessions. SB mentioned that CSM has a lot of experience in this area. There could be potential for common areas of interest to be flagged and meetings coordinated
Arranging **EARLY STAGE PRESENTATIONS** or project reviews with industry	These would encourage earlier creative and prototyping work and would underline any important factors for the students and their projects. The industry involvement could be drawn from the subject area's industry panel who have identified the importance of industrial involvement. Also ref following point.
	Action: Ref Industry review events held in November and ECIF supported collaborative projects – both giving enhanced opportunities for presentation and review with industry
Change the Major Project schedule and make evidence of **PROTOTYPES AT THE INTERIM VIVA a** requirement	In response to concerns about student's prioritising background research and report writing over creative design and prototyping, changes to the established Major Project schedule could help to address this. This could also be an element of the briefing for industry project review sessions.

Table 6 Summary recommendations from Brunel design staff workshop

A final staff workshop brought together representatives of the wider interests in enterprise from within Brunel University (ref Appendices for details). For example staff from the Placement and Careers Centre, who have a University wide role in developing the enterprise qualities of students. Also staff from the Business School, who are involved in delivering enterprise related modules to their students, and also have research interests in this field. As part of the introduction to this workshop an organisation diagram was presented as a basis for identifying the potential synergies, and issues when exploring enterprise in a University wide context. As with earlier workshops a

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specific focus was to identify ideas for enhancing current activity. The resulting points are shown in Table 7. Whilst being more general in nature than the highly focused discussion around Major Projects, the proposals arising from this workshop are indicative of the developing context for enterprise within HE and the related need for Design subject areas to embrace good practice, whilst maintaining the subjects' distinctive qualities. However it is also recognised that there are considerable barriers to effective University wide initiatives, not just at Brunel, but throughout the sector. Progressing many of the proposals identified relies on being able to overcome these internal barriers and is beyond the scope of this study.

Proposal	Note
CREDIT BEARING PLACEMENT MODULE development	A credit bearing module will be implemented at Brunel from 2011-12 consolidating current practice and providing additional student credit for learning outcomes. The internal development process provides scope for coordinating entrepreneurship and enterprise approaches within subject areas and courses. This activity may also link with the development of the HEAR (Higher Education Achievement Record) concept
CAREER PLANNING AUDIT	Ref the Law Careers.net example of an interactive self-assessment tool – This represents good practice with potential for adaptation to suit the design subject area. Note parallels with the Kingston Design area Professional Portfolio module which runs in parallel to the Major Project
DESIGN THINKING component with Business School curricula	There is growing evidence and support for the concept of design thinking within innovation practice throughout industry and organisations. Therefore potential for cross disciplinary input in the Business School. Possibly as a reciprocal arrangement
Building **STUDENT CONFIDENCE**	Lack of confidence, either consciously or unconsciously can seriously impact students' levels of enterprise. This issue is neither widely acknowledged or tackled through current teaching and learning (?) although there are various team-working and army training type activities across the university which aim to build confidence. **Action:** Ref the Industry Review Panels below. This activity had the unexpected benefit of being very beneficial to students' confidence
CROSS SUBJECT LINK with Entrepreneurship and Small Business Ventures module	There appears to be potential for Business School students on this module to link with Design Major projects to add value to each others' work
RAISE THE PROFILE of good practice	There is good scope for getting useful internal and external recognition for good practice in enterprise and entrepreneurship by entering various award schemes
INDUSTRY REVIEW PANELS	The idea of review panels was identified in earlier meetings. But there is good scope for adding value to these events with coordination and input from other areas of the University **Action:** Brunel's Placement and Careers Centre played an important and active role in inviting industry figures to the Industry review panels. Staff from the Commercialisation office took an active part in the evenings. The events were observed by other subject areas, and a variation of the event is being rolled out to at least one other area during 2010/11

Table 7 Summary recommendations from Brunel Enterprise staff workshop

3.2   Major Project Documentation review

Documentation and information supporting Major Project activity is an important element throughout the Major Project journey. Within the scope of this study, it was interesting to explore how these communication materials support or reference factors which might be considered part of enterprise or entrepreneurship. In keeping with the philosophy of the Major Project being the culmination of three years of undergraduate study, both Brunel and Kingston practice has limited additional knowledge-based formal teaching (and related teaching materials) within the Major Project itself. However significant elements are briefing documents, module specifications and assessment frameworks.

Briefing documents at Brunel and Kingston both refer to broad ranges of contextual factors which might form a significant element of Major Projects. At Kingston a series of short projects helps orientate students towards their Major Project topic and these do encompass enterprise elements. For example a creative study of materials and processes could easily consider the economic aspect of a particular manufacturing process (ref the *Spun Metal* case study in the appendices). However in this case the *emphasis* is on creative exploitation of materials and processes. There is no *requirement* that the economic aspects could be an integral part of creative exploitation. The general documentation such as module descriptors and generic briefs are worded to avoid any specific suggestion of emphasis. Rather the emphasis is placed on the student to explore and discover their own positioning within contextual factors. Therefore it can be concluded that consideration of enterprise factors is neither encouraged nor discouraged in the formal briefing materials of major projects. In reality this leaves considerable scope for a range of influences to affect how students orientate their choices of Major Projects. Not least of which is the prevailing culture of the subject area, staff and students. Assessment methods are a crucial and integral part of contemporary HE, and another important aspect to explore. Design is often considered a notoriously difficult subject to assess in objective terms, however the documentation related to Major Project Assessment can be examined for the extent to which it recognises and rewards consideration of enterprise factors.

Brunel Major Projects are assessed on the basis of an interim summative assessment (15%) and final assessment (85%). Each part is further broken down into weighted deliverables, such as final artefacts (30%), which are assessed against detailed grade descriptors.

Kingston major projects are subject to interim formative and a final summative assessment. The Kingston assessment does not specify specific deliverables or weightings, but defines a set of five assessment criteria which cover design related knowledge, skills and understanding.

In the same way that enterprise factors are not explicit in general briefing documentation, there are no specific references to enterprise factors within both design subject areas' Major Project assessment procedures. However using the categorisation of enterprise factors shown in Table 2 (p6), these can be mapped onto much of the existing documentation. For example the A+ grade descriptor for design development within Brunel Major Project assessment refers to '...an excellent level of intellectual understanding of technical/human factors problems within the project'. These factors might easily be re-defined as '...technical/human/environmental and enterprise factors...'. This would not change the intended meaning, but it might flag up that design can also justifiably consider a broader range of factors.

3.3   Review of 196 Major Projects

This study is clearly focused on the future practical improvement of enterprise knowledge, skills and understanding within major projects, however it was considered important to undertake an evaluation of existing practice as a basis for this work. Therefore one of the outcomes is a baseline evaluation of the *enterprise* component of existing practice and major projects at Kingston and Brunel. To provide a basic quantitative analysis of Major Projects undertaken during the academic years 2008/9 and 2009/10, all 200 projects completed in the Product/Industrial/3D design areas at Kingston and Brunel were evaluated. Using the four contextual categories of the HEET radar chart (ref section 4) each project was given a score based on a simple zero-to-three scale, with zero representing no consideration of enterprise factors, and three representing excellent consideration. It was acknowledged that this is a coarse evaluation without refined criteria, but it met the requirements of establishing a general overview of the comparative consideration of different contextual factors and a comparison between practice at Kingston and Brunel.
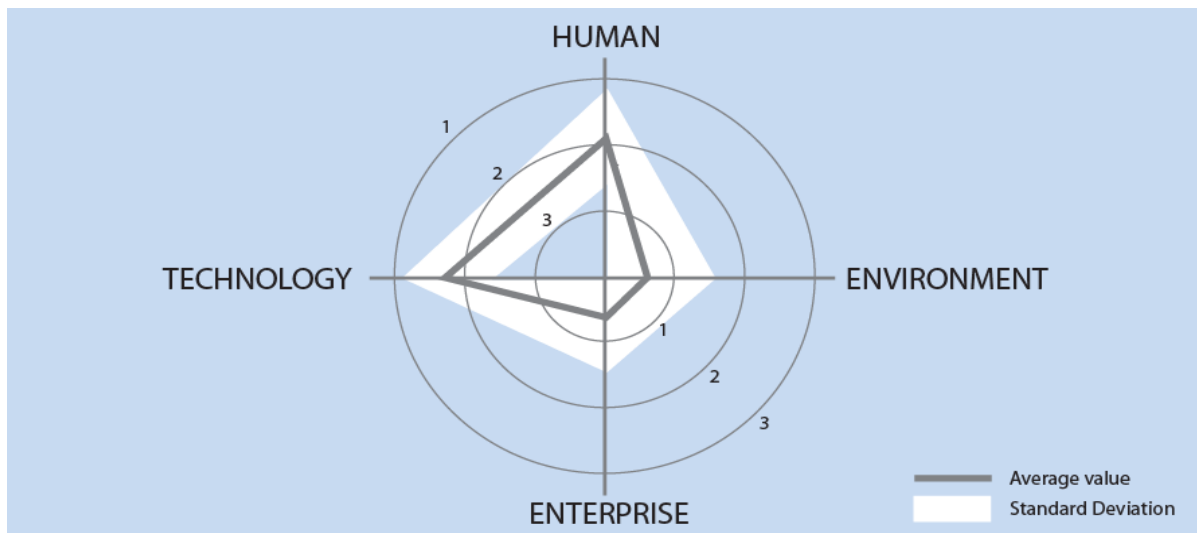

Figure 1: Normalised HEET radar plot of 200 Major Projects

The results are surprisingly similar between the two institutions. Average values for all the projects indicate strong focus on both *Human* and *Technology* factors. This is what might be expected for the professional activity of design where the historic focus, particularly in 3D design areas, ultimately leads to the production of artefacts (technology) which provide enhanced user experience (human factors), although it is widely acknowledged within the profession that the scope of designers' activity is becoming broader and more complex (Lawson, 2006, p17-30). The average of the results do indicate consideration of a broader range of factors, but these other factors receive considerably less emphasis when considering the results of 200 students over two years. The overall average for *Environment* is 0.55, very slightly lower than *Enterprise* at 0.61. It is worth emphasising that these results are not intended to indicate a quality judgement on the work. Rather to expose the comparison between the main categories and factors grouped within *Enterprise* in particular. Figure 2 separates the averages for Kingston and Brunel. The differences between *Environment* and *Enterprise* are negligible, suggesting that neither institution could claim clear differentiation in these areas. Human and Technology factors are surprisingly close. However the results do substantiate what would be generally accepted differences between the major project outputs of the two institutions, with Brunel showing a higher comparative level for *Technology*, whilst Kingston has a higher value for *Human* factor considerations.
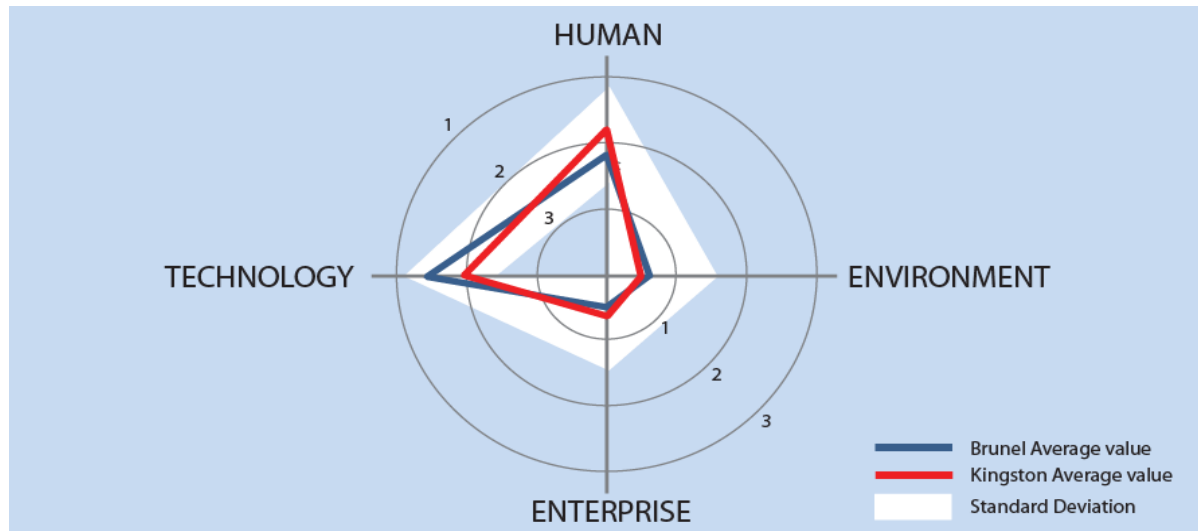
Figure 2 Normalised HEET radar plot of Kingston and Brunel Major Projects

This quantitative exercise provides a simple overview as a basis for considering the relative contribution of *Environment* and *Enterprise* factors within the pedagogy of design courses. In relation to the *Enterprise* category, the economic and academic macro context summarised in section 2, the results provide clear evidence of the scope for, and need for enhancement. Figures 1 and 2 both indicate the range covered by the standard deviation values. This indicates that whilst all students and major projects demonstrate consideration of *Human* and *Technology* factors there are a significant number who have not considered *Environment* and *Enterprise* factors. Whilst the comparative importance of each main factor might be argued and could be a point of differentiation for individual students or institutions, it is proposed that in view of the importance of the complete 360° of factors, students should be able to demonstrate at least a baseline consideration of *Enterprise* (and *Environment*) factors within major projects.

3.4   Review of 15 Kingston and Brunel Major Project case studies

To gain a more in-depth understanding of the enterprise issues and opportunities arising from Major Projects at Kingston and Brunel, and as a means to communicate these points to a wider audience, a number of past projects were selected from each establishment. Staff were consulted in order that the selected case studies would present a spectrum of project types and related enterprise factors. The complete list of 15 projects, 8 from Kingston and 7 from Brunel are included in the appendices, along with the case studies. Each case study follows a template of a summary description, details of the designer, the project, the project process and an analysis of the emerging enterprise points. This analysis has then informed the development of the new teaching and communication tools described in section 4 of this report. Further significant points emerging from this analysis and not addressed by the proposed new tools are explored in section 5: Recommendations for further development.

From the sample of 15 projects a number of consistent challenges, opportunities and examples of good practice in relation to enterprise factors emerge . These are summarised in table 8.

Analysis point	Note	Case study ref
Inexperience and time limitations: Overlooking aspects of a project through inexperience is different to making informed decisions to prioritise factors – such as enterprise. Students are learning, they are not expected to know everything at the outset, but might be encouraged consider the balance within their projects	The prevailing culture of the course may influence the emphasis given to different aspects of a project, although Major Project documentation at Kingston and Brunel does allow a high degree of flexibility. Also ref **Taking a broader view...**	Detail Originals (p47) Eco Chair (p69) Tulipe (p73)
Taking a broader view of enterprise and contextual factors: Many of the case study projects would benefit from the enterprise and other contextual factors being considered more broadly, particularly at the early stages of projects, but also in terms of considering the opportunities arising at the end of projects	Other parallel modules do encourage and cover a broad range of factors, however it is not always clear that the broader view this other content can provide is reflected in the Major project work. Also ref **Inexperience and time limitations**	Build your own (p45) Crossed wires (p67) Detail Originals (p47) Tulipe (p73)
Social enterprise V. Commercial enterprise: A number of students have strong social enterprise interests and qualities, and may justifiably not be concerned with commerce. There can easily be lack of knowledge and confusion over social enterprise and the relative values of different forms of enterprise.	Social innovation and social enterprise are relatively new definitions and may not be widely recognised or understood, both by students and by staff delivering major projects. This is another side to poor perceptions of entrepreneurship. Generally, better understanding of value judgements in relation to both types of enterprise would be beneficial	Ben's Puzzles (p41) Blue Drop (p63) Crossed wires (p67) Hoffman Series (p60) Tulipe (p73)
Individual enterprise V. Enterprising projects: There is a strong artefact orientation within most of the Major Project work observed. Where there is an enterprise focus it is clearly on the potential commercialisation of projects. Lack of confidence and experience are an important part of individual enterprise, but can be a barrier. However other projects demonstrate excellent individual enterprise qualities.	Exploring commercialisation is only one of many aspects of enhancing enterprise. In a number of cases the strength of the project is clearly based on the individual's qualities rather than the commercial potential of their project – which may or not be easily exploited.	Kontour blinds (p50) Mulch Men (p62) ObliqO (p55)
It's OK for enterprise to be a lower priority: This is the reality for most of the major projects examined. Whilst many might have scope for enhancing enterprise factors, excellence within the project work might be in an area diametrically opposed to enterprise – such as in creativity for example.	The Major Project documentation and assessment methods reflect the possibility of excellence in a wide range of areas. This is a core attribute of the design subject area reflected in the notion of T shaped designers. This study does not aim to displace other factors in favour of enterprise, rather to add to the depth and breadth of the work.	Build your own (p45)

University Enterprise and Research resources – Enterprising cultures?: A number of the projects have made excellent use of either University enterprise or research resources and expertise, but there is a sense that this experience is the exception rather than a part of the culture	To what extent do courses, subject areas, staff and institutions have enterprising cultures which actively encourage enterprising behaviour amongst students to capitalise on the potential resources available? How can graduate, project and collaborator 'after care' be developed as an integral part of enterprising cultures?	Ben's Puzzles (p41) Brollii (p65) Mulch Men (p62) ObliqO (p55) Soltan Plus (p71) Variable beam (p75)
Innovation and commercialisation has a high attrition rate – failure is not failure: Students have an inherent emphasis on success and display risk adverse behaviour in the way they view their projects. This can also includes confidence and experience issues and appears to pull them away from more thoroughly exploring enterprise factors	The importance of gaining confidence and risk taking were issues raised during staff workshops, and amongst the case studies there is clear evidence of this risk-adverse behaviour.	Brollii (p65) Kontour blinds (p50)
External input is valuable, but needs nurturing: Overall the benefits of external input, either as advice or collaboration on a brief, is repeatedly demonstrated, but in a learning environment it clearly does not provide all the solutions to enhanced enterprise.	The benefits derived from external collaborations are very varied, typically these collaborations are self-initiated. There is considerable scope for universities to play a more active role in both establishing, managing and maintaining collaborative links.	Crossed wires (p67) Eco Chair (p69) Hoffman Series (p60) Soltan Plus (p71) Spun Metal (p57) Variable beam (p75)
Intellectual Property advice and input: For projects with commercialisation potential, and for students in general, there is an identified need for IP knowledge to be more effectively integrated into course provision	The stand-alone lecture approach to IP knowledge does not meet all the student needs on Major Projects. It needs to be integrated into developing broader understanding of the value of different types of design outcome	Brollii (p65) Variable beam (p75)
The value of exposure: project coverage in the press, exhibitions and the web: A number of the projects demonstrate superb outcomes as a result of widespread media exposure	Kingston work includes a 'Professional Portfolio' module which covers aspects of self-marketing. The positive outcomes are also well supported by the institutions, however there appears to be scope for students to more actively engage with the communication demands of their projects	Ben's Puzzles (p41) Blue Drop (p63) Kontour blinds (p50) Spun Metal (p57)

Table 8 Summary analysis of Major Project case studies

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New Teaching and Communication Tools

4.1   The HEET (enterprise) radar chart

The HEET radar chart (figure 3) was developed as a result of the need to have a simplified method of evaluating the relative values of contextual considerations, including enterprise, within the Major Projects at Kingston and Brunel. Subsequently the concept has evolved through the course of this study and has proved to be an invaluable tool for not only gaining an overview of contextual considerations within existing projects, but as a teaching and communication tool to be integrated into the delivery of enterprise and entrepreneurship content in a variety of teaching and learning scenarios.

A radar chart or spider chart is a widely used visual communication tool for comparative evaluation of three or more variables. Within the industrial and eco design field a well known use of radar chart is the *eco-compass* originally developed by Dow Chemical (Fussler and James, 1996). The developed HEET radar chart includes the significant contextual factors derived from PESTEL type analysis and are re-defined as: Human, Environmental, Enterprise and Technology. Where *Human* is a substitute for *Social*, and *Enterprise* is a substitute for *Economic*. The use of the term *Human* is more familiar to designers, for example in 'human factors' and the direct consideration of individuals, as well as society, as a fundamental consideration within much design activity. The term *Enterprise* makes a stronger link to reflecting on the economic or innovation potential of design intervention within any given scenario. In the HE Design education context the term *Enterprise* is also considered more useful than *Entrepreneurship* as discussed in the introduction.
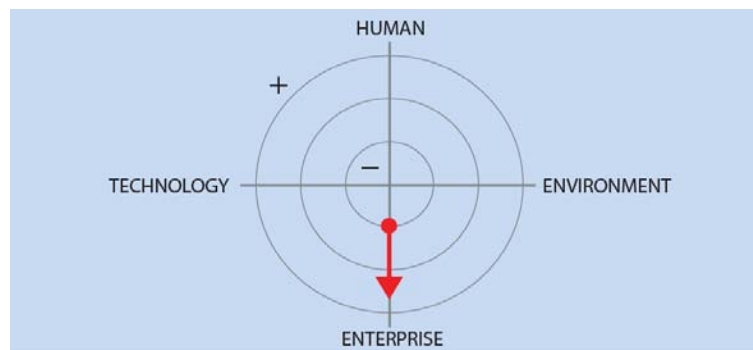

Figure 3 Basic HEET radar chart

The underlying HEET radar concept can be applied very broadly to a wide range of situations where these design related contextual factors need consideration. At the most basic level (figure 3) a simple diagram can be used to communicate that a typical design project will encompass a wide range of contextual factors which can be grouped under the four headings. Further, the relative importance of these contextual factors within any given project can be plotted onto the diagram as a radar chart indicating the area covered by the project. Comparative evaluation of different plots or areas can be simply visually communicated (figure 4). A first iteration of the HEET radar chart was used in a presentation to a new cohort of final year design students in June 2010. The aim in this presentation was to explain that contextual issues, grouped within the *Enterprise* heading, are a

significant component of the complete 360° spectrum of issues which should be considered within design projects. In this case at the early planning stages and consideration of potential topics for individual major projects.
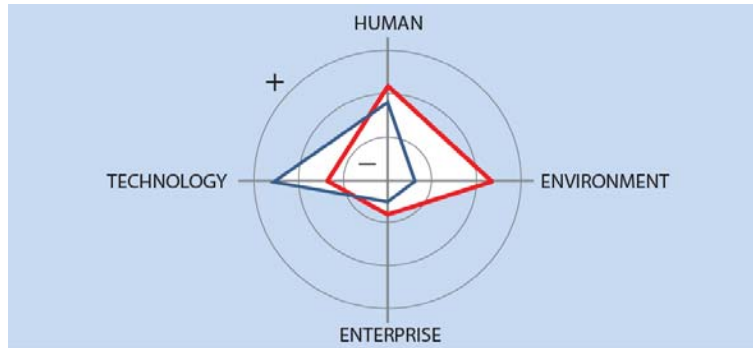

Figure 4 HEET radar chart comparisons

The principle of 'major primary specification elements' (Pugh, 1990, p45) creating a circumscribing framework for design projects is derived from Pugh's influential *Total Design* theory (op cit). Within Pugh's total design model the sequence of design process is a core surrounded at all stages by this circumscribing framework. The identification of a sequential design process is characteristic of a significant number of the well recognised models of design (Dubberly, 2004). Therefore the concept of design process combined with a universal model of contextual factors (figure 6, p25) can be easily recognised and applied within a wide variety of design and academic contexts

Within this study the HEET radar chart was also used as a simple analytical method to review the current Major Project practice at Kingston and Brunel (described in section 3 of this report). In this application a second iteration of the chart was used in which normative values were attached to each of the four elements (figure 1, p17). Through a closer examination of existing assessment methodology and criteria a third iteration of the chart has been developed which applies indicative grades and grade descriptors to each of the four elements (figure 5 and table 9). For specific applications this outline of grades and descriptors provides a basis for developing bespoke variations to suit course requirements.
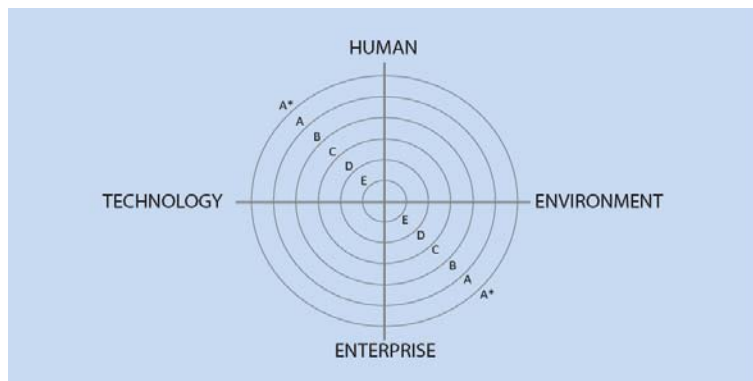

Figure 5 HEET radar chart with letter grade scale

Contextual factor / Element	Grade	Descriptor	Example
Human	Not detailed within this study		
Environment	Not detailed within this study		
Enterprise	A*	An issue or opportunity derived from contextual enterprise factors is core to this project. The work has been constantly driven by superb engagement with the issues, practical work and project outcomes which reflect this exceptionally high level of skills and understanding.	The project outcomes provide a tangible, validated opportunity to progress the enterprise opportunities created through an established network of external project connections.
	A	The project is largely founded on an enterprise issue or opportunity. This has been a strong driving force for an excellent level of consideration of market context and route to market factors. This is evidenced by an excellent level of work and particular qualities within the final design/s.	The enterprise factors incorporated within the project provide a validated basis for realistic further development. This is evident through the deliverables and the high quality first hand external project connections
	B	Enterprise factors have been considered from the outset, and are an important part of the project outcomes evidenced by very good levels of work and analysis.	Very good external engagement through highly relevant first hand project contacts. The external and enterprise factors are strongly reflected in the final deliverables
	C	Market context and route to market factors are an integral part of the project supported by quite good evidence of work and consideration.	There has been some first hand external engagement with enterprise issues and consideration of relevant factors are evident through much of the deliverables
	D	A reasonable level of consideration of enterprise factors is reflected in the work, but there is limited evidence that market context or route to market factors have significantly influenced the project outcomes.	Enterprise related terminology and tools evident within deliverables which connect the design outcome with an appropriate enterprise context
	E	Enterprise issues have been considered, but the level of work does not fully meet the minimum standard of final year undergraduate study.	Some references such as data and terminology used within project deliverables
	F	The project encompasses issues which require consideration of enterprise issues but there is no evidence that these have been considered	
Technology	Not detailed within this study		

Table 9 Indicative grades and descriptors for the HEET radar chart

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The focus of this study is concerned with enhancing entrepreneurship or enterprise, therefore analysis of resulting HEET radar charts in this case is primarily concerned with comparisons of the *Enterprise* element between different examples of practice. Table 10 summarises the types of analysis possible through the use of HEET radar charts:

Who is it for	Analysis	Potential benefit
Students	Initial consideration of major project subjects in relation to a complete spectrum of contextual factors	Highlighting the value and importance of enterprise factors (and other factors which may have been overlooked)
	Ongoing evaluation of the relative value of enterprise factors within the major project	A simple framework of ongoing consideration of and enhancement of enterprise factors with the major project through reflective and experiential learning
Staff	Review and assessment of a complete cohort and/or individual major projects	Rationalised framework for evaluation of enterprise factors within major projects with numerous potential outputs
Business	Objective evaluation of the pedagogy of major projects	Simplified evaluation of the enterprise component of major projects and design HE in general

Table 10 Summary analysis and benefits derived from HEET radar charts

4.2   5D Design process planning

An underlying principle of this study is that enterprise factors should be *integrated* into the delivery of Major Projects rather than taught discretely in other modules or as stand alone lectures. This raises the challenge of *how* this might be achieved. During the project workshops, various conceptual models of design process were used to aid the discussions. The universally recognised core of much design activity is the idea of a sequence of activities from project start to project end. These activities collectively make up a design process or project journey. There is much debate about the detail, variation and relevance of design process theories, however there are general principles which do provide a useful basis for closer examination of the integration of enterprise factors. The HEET radar concept detailed above can be related to the encompassing factors identified by Pugh (1990), which, in his model, is shown perpendicular to a vertical design process core. More typically in graphic representations of design process the axis is shown horizontally. Therefore the HEET radar can be represented as an encompassing horizontal cylinder to a horizontally represented design process. Following design industry practice this is described as Five Ds (Discovery, Definition, Design, Development and Delivery). Figure 6 shows how the HEET radar and 5D design process can be represented in a single graphic model.
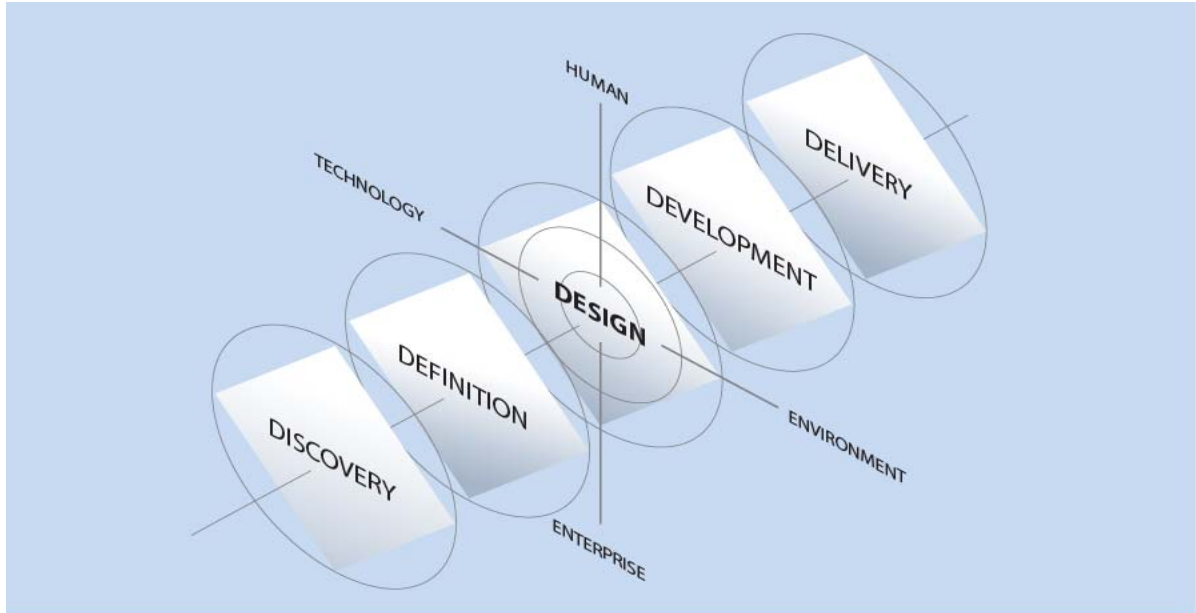
Figure 6 HEET Radar circumscribing the 5D's design process model

This produces a schematic diagram which can be a basis for exploring the relative importance and contribution of enterprise factors throughout a design process journey. For instance does the emphasis on enterprise factors intensify towards the end of the project? Or are they considered at the outset, but with the individual design process subsequently prioritising other factors?

This combined 3D model also provides a basis for exploring the notion of depth and breadth. The concept of Design Thinking and T shaped designers popularised by IDEO (Kelly, 2006) and others was discussed in the first Brunel–Kingston workshop and was recognised as important within the emerging context for design. In the case of the circumscribing HEET Radar, the distance from the centre represents *depth* and the range of factors explored within the full 360° of the radar represents *breadth.*

An earlier version of the diagram shown in figure 6 was used in the Brunel design tutors workshop to both test its value and to explore enterprise related issues within Brunel Major Projects. In summary this exercise confirmed that enterprise factors do not figure strongly within the current work of the majority of Brunel design students. There was no clear difference between emphasis at the start or emphasis at the end of projects. The general pattern is for the breadth and depth to build up towards the middle of projects and for the breadth to decline again towards the end of the project. The diagram proved to be useful tool to explore these issues. It is considered highly important, as reflected in the Major Project briefing documents, for students to have a high degree of autonomy and self direction at all stages of their Major Project journey. The 5D design process model combined with the HEET radar is not dictating an emphasis on enterprise factors, but it is providing a basis for highlighting the possibility of exploring these issues as part of depth and/or breadth to projects at any stage in the process.

4.3   Collaborative project models

An important theme emerging from the various staff workshops and the background context is the value and importance of practical collaboration with the world outside the academic bubble. Collaborations with external organisations and individuals of various types have historically been a part of design major projects. It is also a feature of many design courses to include 'Live Client' projects within the curriculum at second or early third year level. However with the ethos of most Major Projects focusing on the student's self initiated direction and interests, neither Kingston or Brunel Major Projects have featured any systematic process for introducing or encouraging collaborative projects. They have tended to be established on an ad-hoc individual basis, with or without active input from the Design subject area.

As an integrated part of this study, and the aim of enhancing enterprise in major projects, Designplus identified the opportunity to develop and pilot an initiative to set up a number of collaborative project opportunities for Brunel design students. As an additional encouragement to both the student and the collaborating organisation Designplus was able to successfully secure funding from HEFCE's Economic Challenge Investment Fund (ECIF). A feature of this external funding is that there will be a benefit to the company or organisation derived from the collaboration. This usefully underlines the enterprise orientation of the projects. For the 2010/11 academic year Designplus has set up 25 individual, very diverse Major Projects (ref appendices). This represents a significant increase in numbers of collaborative projects. At the time of writing the individual projects are currently underway and due for completion at the end of April 2011. Therefore detailed analysis of the learning and enterprise outcomes for the students and the benefits for the companies can not yet be carried out. However the challenges and potential benefits of such a scheme can be identified. Table 11 summaries these factors in a chronology relating to delivery. There is a considerable amount of work involved in establishing and implementing a scheme of this type. And the human and financial resources have to be created in order to achieve the benefits, but once a scheme is established there are savings derived from not having to carry out activities from scratch, such as developing IP arrangements or developing templates for suitable briefs.

Stage	Challenges	Potential enterprise benefit (who benefits)
Pre session **External Marketing**	Having resources and/or liaising with existing University departments (eg Careers and Placement, or Knowledge Transfer offices to promote a Collaborative Major Project scheme	Design subject areas and University departments benefit from increased cooperation to achieve mutual objectives of increased links with business (Design staff and University)
Promoting to students	'Selling' the benefit of collaborative projects versus entirely self-initiated projects, which can also include the need to have all relevant teaching staff 'on-side' with the value of collaboration.	Students gain additional perspective and understanding of the benefits of working with external projects (students)
IP arrangements	Creating appropriate contract templates to cover all IP and other issues which need to be in place to protect the interests of all parties involved	Once in place these templates are a valuable asset to streamline the process of establishing collaborative projects (All parties)

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Selecting suitable projects/companies	There has to be discussion, negotiation and agreement with potential collaborators to ensure that company interests and student needs are matched	The staff team build experience, and capacity, to improve the dialogue between academia and business (Design staff and collaborating companies)
Term time **Briefing**	Matchmaking students with project opportunities to ensure the most suitable students are incentivised and matched with available projects. Together with high quality briefing materials as a basis for this matchmaking	Students are selected to work on projects which are a good match for their interests and which provide considerable enterprise benefits in relation to the traditional default option (students)
Managing projects	Design staff, collaborating company and student working effectively together (often under considerable time pressures) to ensure mutually agreed objectives are reliably met.	Design staff gain experience of, and capacity for managing external projects. Student's develop crucial project management and project delivery skills in a commercially realistic context (Design Staff and Students)
Completion **Documenting the project**	The project 'asset' is much more than the student's project and learning outcome. It includes the learning, knowledge and marketing potential embodied in the project – for the Design subject area and University. But this asset is often not adequately captured.	Integrating suitable capture of project assets within the project process, more easily allows the learning and knowledge derived from the project to be shared and promoted for a wide variety of purposes (all parties)
Next steps **Building a relationship**	Both the project outcome and the collaboration with the company are likely to have future potential, but typically the end of the project is the end of the University or Design subject area's practical involvement.	The student may benefit from further development of their project or employment opportunities. The design subject area might set up future projects or continue to support the project development. The company can identify high quality potential employees and continue to receive project input which might not otherwise be available to them. (all parties)

Table 11 Chronology of steps, challenges and potential benefits from collaborative projects

4.4   Industry review

The importance of input from industry is perhaps the overriding message from the literature review (Cox, 2005, HEA-ADM & NESTA, 2007, Design Council/Creative & Cultural Skills, 2007). In the design staff workshops held at Kingston and Brunel Universities exploring practical ways to incorporate industry input was a significant interest. From this workshop activity the idea of Major Project Industry Reviews was established. Whilst a number of Major Projects might traditionally involve working collaboratively with industry, or gaining external input into project work, this is certainly not a consistent or comprehensive part of the major project experience. Students do, almost universally, have the opportunity to show their work at end of project 'Degree Shows' and exhibitions, and they may well receive useful input from industry at this point. This provides both feedback on their project work and networking and employment opportunities. However the feedback on their projects is now too late to influence the student's work and their direct learning from the project process.   Another factor, which was raised during the staff workshops, was the observation that lack of confidence and experience in interacting with industry could be a significant barrier to students adopting enterprising characteristics. The opportunity to interact with industry during the proposed events, in a relaxed, un-pressured and supportive environment was seen as an important potential benefit of the initiative.

Industry Review evenings were developed and implemented at Brunel University as part of this study in November 2010. The concept was that *all* students' Major Projects would benefit from *more* external views than the traditional default level of external input (which might be as low as zero external input). In relation to this study, the value of this particular initiative was also to develop and pilot the methodology for the implementation of the idea. At a minimum level this would then lead to the practice becoming embedded as an integral part of future years Major Project delivery.

Image 2 Joe Ferry, ICG, Senior Vice President Global Guest Experience & Design

In practical terms, the concept needed to facilitate a number of representatives from industry reviewing the whole cohort, and for each student to be able to extract meaningful feedback points which could be of practical benefit to their projects and, or, future plans. This was achieved by dividing the cohort of 115 across three themed evening events. About 10 external guests attended each evening (ref appendices) and they were supplemented by staff from the various enterprise functions within Brunel and other staff from the School of Engineering and Design. Each guest was briefed on the event and asked to review a minimum number of allocated students. This ensured that every student was guaranteed to receive input from at least three guests. To enable these exchanges to take place in a useful and relaxed environment the students mounted a summary graphic panel representing their project in an exhibition space. Drinks and refreshments were provided!

Picture 3 Graham Brett, MD, Therefore Design consultants talking to Michael Stanley

Summary comments from different perspectives, including those undertaking collaborative projects include:

Stephen Barker, of colour technology firm LCR Hallcrest (collaborative project): "These were projects which we really wanted to do, but never had the time or resources to tackle. For a small company, access to this sort of option for research and development fills a gap between in-house work and bringing in a professional agency."

 Another Major Project partner, Adam McDougall of The Lexi Cinema, said, "From our point of view, this sort of project just made absolute sense. Our cinema is about fun, mischief and personality so the opportunity to work with such a great student in developing our brand presence was perfect for us."

Brunel Design undergraduate Nick Sardar said, "I managed to review my work with four professionals from different companies and job roles. This diversity brought up questions over my work that I had previously overlooked. It was inspiring to meet professionals as, apart from my placement, I have had limited exposure to the industry so far."

Paula Neal, Project Manager of DesignPlus, added, "The event will improve the students' understanding of design for business and give them an insight into problems they will need to consider whether they are employed in-house or through an agency."

The Head of Design at Brunel, Dr Sharon Baurley, added, "If the (student's project) concept is successful the companies know that they are likely to be able to keep developing it and maintain continuity through having a successful relationship with the student already in place."

The events proved to be a great success for all involved . To establish the concept in the first place did require gaining the buy-in from staff and students at Brunel together with the additional work load to secure the input of the guests and to manage mounting the exhibition and run the evenings. But the positive responses from all parties means that this initiative is almost guaranteed a regular appearance in the annual calendar. Table 12 summarises the challenges and benefits for each group of stakeholders

Who	Challenge	Potential enterprise benefit
Students	This was a new initiative which would require a little extra work and involve activity (interacting with industry) which some might be anxious or unconfident about. Benefits might not be clear from the outset.	Practical feedback on Major Project work at a stage at which it can be acted on to benefit the project. Developing networking contacts for project and employment benefit Developing communication skills and related confidence in dealing with industry
Design Staff	Achieving buy-in from design staff to support the activity through their support for the students, sharing contacts etc. Countering any perception of additional work or distraction from what might be considered higher priorities	Exposure to additional external perspectives on student project work and design methodologies. Opportunities to develop and build industry contacts and networks for future activities.
Enterprise Staff	Achieving buy-in from Enterprise staff to participate and provide industry contacts, marketing and administration support	Enhanced collaboration with students and staff and enterprise opportunities derived from networking with industry guests.
Business	Securing the input from industry (busy schedules, relevance etc). Ensuring that guests approach the 'task' with the spirit of supportive and helpful input to the students' work and future careers.	Influencing students' work and staff and subject area thinking. Identifying future 'talent' and project ideas for their own business opportunities

Table 12 Summary challenges and benefits for stakeholders in the Industry Review evenings

4.5   Route to market

A traditional Major Project in the Product or Industrial design area culminates in a design artefact or series of artefacts. For academic assessment purposes artefacts are considered alongside evidence of the student's design process. At Kingston the Major project is assessed through this collection of final artefacts and supporting process. Brunel includes these elements, but also includes assessment of a Major Project report and an interim and final viva (verbal presentation of the project). Other qualities of design knowledge, skills, understanding and graduateness, including enterprise factors, which are not integral to the Major Project, might be assessed through other modules or activities. However the Major Project is an excellent basis for considering a wide range of enterprise factors (ref table 2, p6). But it is not always clear from assessment practice or in teaching and learning practice where the enterprise factors are covered. (ref section 3.2, p16). A module within the Brunel design courses titled 'Innovation Management' has historically been delivered as a stand-alone module. This module does include many enterprise factors in the outline of module objectives (ref Brunel Design Innovation Management module outline, 2010,

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1. Acquire and use market knowledge to identify and target new commercial opportunities.
2. Organise and use data from a range of disparate sources to support and justify decision making
3. Synthesise innovative strategies and proposals to achieve product/system development project objectives.
4. Identify key risks in innovation and produce development and suggest appropriate risk mitigating methods.
5. Analyse design and development problem domains using a range of formal techniques
6. Use established information management tools and methodologies to assist in product/systems development

However there was anecdotal evidence from the Brunel Design staff workshops that students do not necessarily make the cognitive connection between their work on the Innovation Management module and their Major Project. It is a well established pedagogic principle that learning is greatly enhanced through project based learning approaches (Ramsden, 1992 p81) with summary benefits including: attracting, exciting and motivating students, providing a rich opportunity for students to learn professional and life skills, introducing professional context and practice domains and laying a pedagogic foundation for deep learning key principles (Crawley and Soderholm, 2007).

Staff leading and delivering the Innovation Management module attended the staff workshops associated with this study and saw the opportunity to directly link one of the module assignments with the Brunel Major Projects. This assignment, entitled 'Business Plan Development' (ref appendices) has been implemented for the academic year 2010/11. The assignment is designed to reinforce the modules' objectives, knowledge, skills and understanding, but crucially does this by requiring every student to produce a report in the form of a business plan for the concept emerging from their Major Project. This work will not be submitted until March 2011, so it is not possible to report on the results here, but table 13, below, identifies the anticipated enterprise benefits of the assignment based on the categorisation of enterprise factors shown in table 2.

Enterprise Factor	Anticipated enterprise benefits for students
Market Context	Consolidates and summarises the student's consideration of market factors relevant to their project contexts such as: • Macro economic factors • Competitors and competitive products and services • Stakeholders • Trend forecasting and analysis
Route to Market	An opportunity for the student to consider and document the specific route to market options and issues for their project including • New Product Development and business planning • Risk and barrier analysis • Intellectual Property • Marketing planning
Individual Enterprise	Encouraging individual reflection on personal enterprise opportunities and consideration of the knowledge and skills required to achieve personal goals including: • Project planning • Communications • Enterprising qualities (vision, initiative, leadership, drive etc)

Table 13 Summary intended benefits of integrating a 'route to market' assignment within Major projects

Recommendations for further development

Through the invaluable input and support from the wide range of people and organisations involved with this study over the past nine months, a remarkable amount of practical results have been achieved (Refer to appendices for further details).

- **Staff workshops involving 31 members of staff**

- **Enterprise in Major projects briefings and enterprise assignments for 115 Brunel students graduating in 2011**

- **A symposium attended by 75 HE and Industry professionals**

- **Major Project Industry review evenings attended by over 40 professionals, interacting with 115 students and their major projects**

- **25 Collaborative projects established with industry partners**

Broader benefits derived from these activities include the development of new teaching materials and project and event templates, together with numerous new connections with industry and between Brunel and Kingston design subject areas.

The challenge is now to further embed and develop the activities and successes developed within the study. The following points summarise the immediate practical potential.

- **Repeat and development of successful initiatives at Brunel in the 2011-12 academic year:** Enterprise in Major Project briefings, Collaborative projects, Major Project industry review evenings and business development plan assignment

- **Ongoing development and dissemination of the collateral arising from the study:** via websites, academic journals and conferences and internal development activities: Enterprising Major Project case studies, enterprise teaching and communication tools, collaborative project templates

- **Ongoing development of links with the design area at Kingston:** potential to roll out activities such as collaborative projects and Major Project industry review evenings

A greater challenge is the ambition for the momentum and ideas established with this study to achieve an impact in the whole UK design HE sector and beyond. This study has both highlighted the barriers to this, but also the possibilities of achieving real impact in a relatively short timescale.

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Appendices

7.1   Summary of events

Event / Meeting	Attendees	Date	Venue
Kingston – Brunel design staff workshop	11	10 March 2010	Kingston University, Knights park campus
Brunel Design staff meeting	11	26 May 2010	Brunel University
Brunel Major Project Briefing	100	23 June 2010	Brunel University
Kingston – Brunel Case study development meeting	7	14 July 2010	Kingston University, Knights park campus
Brunel Enterprise staff meeting	9	8 Sept 2010	Brunel University
Symposium: Enhancing Enterprise in Design Major Projects	75	15 Sept 2010	Brunel University, Newton Rooms
Brunel Major Project Industry Review evenings	200	22,23,24 Nov 2010	Brunel University, Michael Sterling Building

7.2   Innovation Management Assignment

Business Plan Development

Over term 2 you will be introduced to the principles of strategic planning and useful tools/techniques. This assignment aims to help you develop entrepreneurial thinking and learn how to pitch your idea/design using what you have learned in this module.

Tasks

You are required to produce a report (max 5,000 words) in the form of a business plan for a new product resulting from your major project. The report should cover:

1. **Introduction** (750 words): This section should include:
   1.1. Give a brief description about the industry or sector where your product belongs
   1.2. Provide a brief explanation about your targets and their requirements/problems
   1.3. Present a list of direct competitors and their products/services (max 3 competitors)
   1.4. If there is no direct competitor, please present substitute products/services.

2. **Route to Market** (1,500 words): This section should include:
   2.1. Exploration and evaluation of 2 or 3 possible routes to market for your product (e.g. starting own company, partnering with companies with relevant NPD expertise, partnering with and established business within the target industry) In each case consider:
   - Barriers
   - Benefits
   - Resource requirements
   2.2. List all activities required to implement your idea in practice, based on your preferred route to market using appropriate tools (e.g. Work Breakdown Structure)
   2.3. Demonstrate a timeframe of design implementation using appropriate tools (e.g. Gantt Chart or PERT Chart)

3. **Marketing Plan** (1,500 words): Consider this as information required as part of securing the chosen route to market (eg as part of a business plan or presentation to a potential partner)This section should include:
   3.1. Compare your product and those of carefully selected competitors' using appropriate tools/techniques (e.g. Perceptual Map, QFD and/or Concept Evaluation) and identify unique selling point(s) of your product.
   3.2. Plan Marketing Strategy – clearly describe:
   - Segmentation: *How do you segment the market?*
   - Targeting: *Why do you choose certain target groups*
   - Differentiation: *In what way, will your product be different from others?'*
   - Positioning: *Where will you position your product?*
   3.3. Plan Marketing Mix
   - Product: Describe in detail what you will offer to the targets. You may use some tools/techniques to help you plan your offering, e.g. Function Analysis.
   - Price: Give an estimate price and justify why it is suitable for your product. You may apply some tools/techniques to help you establish the price, e.g. Value Analysis and Return on Investment (ROI).
   - Place: Plan how you will deliver your product to your targets, e.g. retail shops.
   - Promotion: Explain how you will raise awareness about your product.
   - You may consider adding People, Process and Physical Evidence.

4. **Risk Management** (1,000 words): This section should describe how you will address potential risks/product failures. Appropriate tools, such as Failure Modes and Effects Analysis (FMEA), can be used to anticipate potential failures and plan how to address them. (Even for a simple product, a complete FMEA document can run to many pages; far too much work for this assignment! A section of FMEA demonstrating around 10 – 20 Risk Priority Numbers will be sufficient to demonstrate your understanding.)

5. **Summary** (250 words): You should clearly summarise your business plan – you could treat this section as a factsheet that accompanies your exhibits at Made in Brunel.

Hand-in

Deadline: 4.00pm Monday 28th March 2011

Deliverables: One hard copy and one electronic copy

- Hard copy to Taught Programmes Office by above deadline
- Electronic copy submission via u-Link by above deadline

Note: The submission is not complete until both copies are submitted.

Deliverables

The hand-in should be in **A4** report format (possibly with fold-out A3 sheets). Note that the document should work on screen as well as in hard copy. The assignment does not necessarily call for a long essay type submission; some aspects may be suitably presented as bullet points for example. However, the onus of communication is on you. You should use illustrations, images, diagrams and text to communicate your thoughts for assessment.

Assessment criteria

		A	B	C	D	E	
1.	Appropriate choice of analytical and strategic planning tools – avoid redundant and unnecessary works						10%
2.	Thoroughness of use and application of those tools and quality of the outcomes						20%
3.	Quality of the Route to Market plan – all essential tasks are identified and clearly presented; a timeframe is carefully planned						20%
4.	Quality of the marketing plan – feasible and fully justified why these plans are suitable for your product and target audiences						20%
5.	Quality of the risk management – thorough examination of potential failures and clearly explain how they will be addressed						20%
6.	Overall standard of presentation – the completion of the report, graphical tidiness and clarity of information						10%
Total							**100%**

Grading

A Excellence demonstrated in all major and minor requirements.
B Excellence demonstrated in all major requirements; some minor requirements not fully met.
C Competence demonstrated in all major requirements; many minor requirements not fully met.
D Basic understanding of, but not necessarily competence in, all major requirements. The minimum standard to satisfy the requirements of the course.
E Basic understanding of some but not all requirements.
F Very few or no major requirements satisfied.

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7.3   Participants

Brunel Design Staff	Stephen Green	Principle Investigator
	Youngok Choi	Innovation Management Tutor
	Busayawan Lam	Innovation Management Tutor
	Sarah Silve	Major Project tutor
	David Harrison	Design Subject Leader (Up to September 2010)
	Darren Southee	Course Director – Industrial Design & Technology BA
	Richard Rakowski	Major Project tutor
	Paul Turnock	Course Director – Product Design & Product Design Engineering BSc – Major Project Module Leader
	Sharon Baurley	Head of Design (from September 2010)
Designplus Staff	Paula Neal	Project Manager (from September 2010)
	Karen Young	Project Manager (Up to September 2010)
	Jenny Moss	Project Coordinator
	Theresa Pert	Project Coordinator
	Catriona Carey	Research Assistant (Kingston)
	Stephanie Fox	Research Assistant (Brunel)
	Poi Jun Lam	Research Assistant (Brunel)
Brunel Enterprise staff	Jane Stanley	Director, Placement and Careers Centre
	Tony Waite	Placement and Careers Centre
	Pauline Seston	Placement and Careers Centre
	Finton Clear	Lecturer, Brunel Business School
	Weifeng Chen	Lecturer, Brunel Business School
	Andrew Ward	Director of Corporate Relations
	Adrian Simon	Director of Commercialisation
	Stuart Wright	Head of New Business Ventures
	Averil Horton	Research Support and Development Office
	Theresa Waller	Director, Research Support and Development
	Clive Gee	Director of Development
Kingston Design Staff	Simon Maidment	Course Director – Furniture and Related product design BA
	Phil Davis	Major Project tutor
	David Lawrence	Head of School of 3D Design
	Eleanor Renfrew	Course Director – Fashion Design BA
Kingston Enterprise staff	Peter Christian	Business Development Manager – Faculty or Art, Design and Architecture
	Martha Mador	Head of Enterprise Education
Brunel Students	Mark Ayres	MSc Student (UG at Leeds Metropolitan)
	Emily Callendine	MSc Student (UG at Sheffield Hallam)
Industry Review Evenings	Adam McDougall	The Lexi Cinema
	Alun Wilcox	PDD, Head of Medical
	Andy Patsalides	Compass True North, Managing Partner

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	Ben Boutcher West	Bosch, Design Engineer
	Ben Griffin	The Alloy, Principle Designer
	Chris Worrell	SLE, Industrial partner of ECIF Major Projects
	Dan Shepherd	Gear 4, Designer
	Donald Parr,	Velopex, Managing Director
	Ellen Piercy,	ReckittBenckiser, Manager, New Technologies Group
	Graham Brett	Therefore Product Design, Managing Director
	Ian Scrimgeour,	Swiss Precision Diagnostics
	Izzy Adams,	PG Gillette
	James Brown	fwdesign Limited, senior design strategist
	James Lamb	Lamb Industries, Visiting Professor of Innovation
	James Tanner	Factory Design, Senior Engineer Designer
	Jan Newel-Lewis	Native Design Consultants
	Joe Ferry	ICG, Senior Vice President Global Guest Experience & Design
	Joe Langford	Human Factors Solutions, consultant
	Julian Swan	PDD, Senior Engineer Designer
	Lee Harper	Marks and Spencer, Product Manager
	Marc Tanner	IDC, Head of Design
	Mark Hester	PDD, Head of Prototyping
	Natalie Vanns,	Nokia, Senior Design Engineer
	Neil Gilchrist	PBFA, Commercial Executive
	Neil Tierney	Onzo Ltd, R&D Director
	Nick Marchant	Marchant Associates, Design Consultant
	Nick Tyrrell	Rocket Medical,Product Manager R&D
	Patrick Hall	Maddison Design Consultants
	Paul Hetherton	PG Gillett, Strategic Opportunities
	Paul Scrase,	Truth Marketing, Senior researcher
	Paula Zuccotti	Seymour Powell, Senior Researcher
	Peter Swan	MERU
	Roger Carr	Radar, Furniture Designer
	Simon Langham	Dyson
	Stephen Barker	LCR Hallcrest,
	Steve Stuart	Doorentry Direct Ltd
	Toby Massey,	B-Eco-Things, sustainable designer and entrepreneur
Collaborative Projects	BPMA	Thermo chromic fridge device
	Claydon Yieldometer Ltd	Seed metering and delivery system
	Controlled Projects Ltd	Next Generation HCI (Human Computer Interface)
	Door Entry Direct Ltd	Review of vandal resistant panels
	FIRA International	Adjustment mechanism for secondary school chairs
	Hamilton Bradshaw	Sanitation Solution for the underground
	Hamilton Bradshaw	Beach safe - improving security of personal belongings on the beach
	iDiPac Ltd	Variable Dose Granule Dispenser
	Kontrol Freax Ltd	Aurora system control console
	MERU	Arm guide

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	Minima	Temperature safe Baby bottle
	Mobsventures	Pocus Media Service
	PBFA/LFE	The Ultimate Luggage A
	PBFA/LFE	The Ultimate Luggage B
	PBFA/LFE	Interactive Infant toys A
	PBFA/LFE	Interactive Infant toys B
	SLE	Disposable exhalation block and silencer for SLE5000
	SLE	Next Generation Product range
	SLE	Neonatel breath monitoring
	Sumac UK Ltd	Sumac Collaboration Mobile App
	Tailormade London	tbc
	Tendon Clinic	Interactive exercise website
	The Lexi Cinema	Lexi 1 mile impact
	Tom Dixon	Ceiling fan
	uBlox	Sports team analysis and tracking

Symposium		
Key note speakers	Anne Boddington	Dean of the Faculty of Arts at the University of Brighton, and an elected member of the executive for the Council for Higher Education in Art & Design (CHEAD)
	David Worthington	Chairman of the Lloyd Northover Group at AIM listed Media Square plc and Chair of the UK Design Alliance
	Gus Desbarats	Founder and Chairman of The Alloy and Chair of the BDI
	David Riley	Co-founder of the Mandeville Recruitment Group and Brunel Entrepreneur-in-Residence

Student case study presentations	Matthew Nourse	2009 graduate, Brunel University
	Chris Richmond	2010 graduate, Brunel University
	Stephanie Fox	2010 graduate, Brunel University
	Natalie King	2010 graduate, Brunel University
	Michele Camerlengo	2009 graduate, Kingston University
	Leila Chouikh	2010 graduate, Kingston University

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7.4   Brunel and Kingston Case Studies

Kingston Projects	Designer	Year	Page
Ben's Puzzles Jigsaws designed for Alzheimer sufferers	Ben Atkinson-Willes	2008/9	41
Build your own Space Personalised workspace	Jung Hee Kim	2009/10	45
Details originals Reviving old crockery	Richard Brendon	2009/10	47
Kontour Blinds Venetian Blinds	Helena Karelson	2008/9	50
Mulch Men Bio-degradable Toys	Arran Evans	2009/10	62
ObliqO Personal self powered Urban Vehicle	Michele Camerlengo	2008/9	55
Spun Metal Exploration of Metal Spinning	James Michael Shaw	2009/10	57
The Hoffmann Series Ethical Furniture	Leila Chouikh	2009/10	60

Brunel Projects			
Bluedrop Water Purification Device for Third World Countries	James Bartlett	2009/10	63
Brollii Rain Protection System	Simon Warne	2009/10	65
Crossed Wires Social skills teaching aid for young people with ASD	Stephanie Fox	2009/10	67
EcoChair Single use eco-seating for the events market	Christopher Richmond	2009/10	69
Soltan Plus A unique solution for the prevention of skin cancer	Alex Bygrave	2008/9	71
Tulipe Feedback Plant Pot	Natalie King	2009/10	73
Variable Beam Width LED Lamp An architectural lamp with variable beam angle	Matthew Nourse	2008/9	75

Ben's Puzzles

Jigsaws designed for Alzheimer sufferers

Ben Atkinson-Willes
Product & Furniture Design BA
Graduated 2009
Kingston University London

Summary

A young entrepreneur has designed an activity puzzle in response to his grandfather's diagnosis of Alzheimer's. Ben's Puzzles aim to keep the affected mentally active for longer; improving their quality of life.

Designer

Ben Atkinson-Willes is a young London-based designer who graduated from Kingston University in 2009. He has two companies; Ben's Puzzles and Future Industries. Ben has won many awards for his work. Design started for Ben in secondary school. He enjoyed the hands-on creative side of generating new products and ideas. When doing his foundation at Kingston University, his decision to pursue the Product and Furniture course was greatly influenced by a speech Course Director, Simon Maidment made. Ben recollects that 'It seemed like a new exciting course; lots of energy and an exciting place to work'. Another influence Ben mentioned is his father who did Sculpture at St. Martin's; 'he was really hands-on and got me involved in making things from a pretty early age'. Speaking of the course at Kingston, Ben says 'there's such a broad range of people and ideas; I don't think there's a set Kingston style. I suppose overall it's more creative.' Ben believes that the designer's role is really important within healthcare. He says 'taking an idea through from concept to reality; its not just about the idea, its about the execution, detail and the research'.

Ben's Puzzles are jigsaws designed expressly for those diagnosed with Alzheimer's and dementia. 'My grandfather has Alzheimer's disease and it just started off as an idea and I found that one of the major problems was trying to find stuff for him to do. So I thought I might as well try to come up with some ideas and do something about it; that led to the first design and seeing how it worked'. The edge of the image forms a frame for the large, tactile pieces to fit into; making the user's experience all the more pleasant. 'A background designed for contrast and low vision guides users to help them match and place the pieces in the correct position.' The material used for the jigsaw is called foamex, which is easy to clean, flexible and durable.

Context

Ben's project is directed towards the healthcare profession and individuals who know somebody affected by mental deterioration linked with Alzheimer's. Of the 700,000 people with dementia in the UK, around 400,000 have Alzheimer's disease. Most people who develop dementia are over 65. There is an estimated 30 million people with dementia in the world. In the first quarter of 2010, consumers spent £1126 million on pharmaceutical products £137 million other medical products and £745 million therapeutic appliances and equipment. One could take from these statistics that people are increasingly giving priority to miscellaneous healthcare products over household items for example, which have seen a decline in the same period of 2010.

Process

The project began in Ben's second year with quite a lot of research into the problems and the difficulties that people with dementia face. That led to the first design which Ben tested on his Grandfather. He didn't really know where to go from there but a meeting with Kingston Researcher, Professor Hilary Dalke gave him the confidence to pursue the project in greater depth, 'I met with Hilary and when she saw what I had done she said: "that's a really good idea-lets try and get some funding", she was doing a project on Alzheimer's for Audi. So she

found out I was doing a project on it; got involved and helped me get some testing, funding and find the right people; she was pretty key to the whole thing really.' Hilary was involved from 2nd year all the way through. She still helps Ben now. The funding started in 3rd year and came from a university-based competition course run by Enterprise at Kingston; 'they give you money and help develop your business side of the product. It was really useful; telling me how to start a business, protection of designs, how to do your accounts – all of that stuff that you don't really learn about on design courses. I was the only 2nd year taking part so I was a special case.' The £5000 given to Ben for winning the Enterprising Graduate Award allowed him to generate prototypes, fifteen in total, to refine the idea to what it is today. He also took part in a one-year mentoring scheme, attended regular meetings with other graduates/entrepreneurs and received expert input on aspects of developing an enterprise. A lot of the development was down to trial and error and testing to see what would work best. It took about a year from start to finish. He initially used the 3D Workshop to mock-up his prototypes but as the process became more complicated, he decided to source an external manufacturer as he had got to the stage where he wanted to get the jigsaws into production. 'It took just over a year and I'm still developing, I've just made some changes to the next production run, I've had some more testing done so its still ongoing.' When asked if there was anything he wishes he could have done throughout the development of his Major Project he said that he wishes he had not wasted time on manufacturers who over-charged and did not produce the jigsaws to his expectations. This was a lesson learned the hard way; 'I chose one that was a bit more expensive, I hadn't briefed them well enough so when it came back it wasn't right so I had to get another one made; nothing big but if I was to do it again; I could have done it much faster'.

Product Benefits

The effect of this product on the people who use it is that of enjoyment, a greater sense of independence and achievement. 'One resident, who hadn't spoken all day during our testing, began talking about his time in the war when he completed the puzzle with a picture of a Spitfire', Ben says. This result was significant as people with Alzheimer's often become more distant and

reluctant to get involved in tasks. 'The puzzle sparked a memory for him, and the sense of achievement he gained completing the activity is what my project is all about'. The success of the project has made an impact on the lives of Alzheimer's patients and their families; a result he is very pleased with as he has first-hand experience of the effect the disease can have. 'I think it has a pretty significant impact on a lot of people. It's not something that works with everyone but it had a good uptake. It's surprising to see how beneficial something that simple is; just that act of being able to finish something yourself, no matter how easy or trivial it may seem. Its pretty obvious how satisfying it is; I know definitely with my Grandpa, he'll finish it off and if you try to put it away, he doesn't want you to break up the work he's just done. I think especially in care homes as well where everyone is sitting around a room doing nothing; just to be able to do something; its hard to appreciate it from my perspective or your perspective, but if you don't do anything or feel as if you cant do anything, just being able to do something is pretty rewarding.' The amount of exposure gained in the process of developing his work has given him a name in the design world and equally so amongst those in the healthcare profession ; a massive plus for future endeavours.

Enterprise Analysis

The key part of the promotion of his project, Ben says, was the Kingston Press Office which was 'absolutely awesome when I launched the first jigsaws in July last year. I basically had a huge press release; they got me in loads of dementia care magazines, loads of medical websites, they got me in the Mail on Sunday in August which is what kind of set it off. Without that I probably wouldn't have been able to keep up the motivation to see it through so it was really lucky'.

As soon as the Mail on Sunday article came out in August, suddenly Ben received more orders than he could handle 'I didn't know what to do. I only had a tiny number of products because I couldn't afford to make them and suddenly that was pretty, obviously really good, but really stressful'. Ben only had 80 puzzles available to sell. He sold them all within 2 days of the article being published. Many more orders were made at the time but these people had to wait a month for
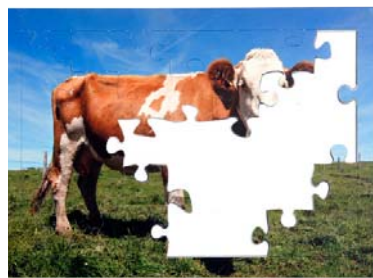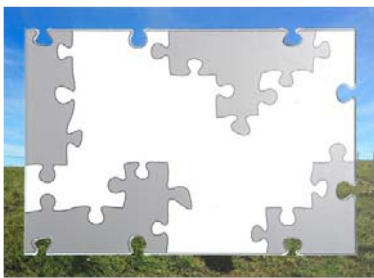
Ben to arrange their manufacture, which they were willing to do.

John Lewis showed some interest early-on because they were dong a dementia campaign but at the time Ben wasn't really set up to handle such quantities. He sells the products from the Ben's puzzles website but that is changing soon to Active Minds which is his new company name. He had lots of orders from the big care home companies who order in bulk. Most of the sales are web-based so if people search dementia on the internet he will appear on Google Adverts. Ben has been working on a new product which will be launched in October. These and the jigsaws will be available soon from the Boots online store and ASDA too. Ben also has a distributor in America; a small puzzle supplier; 'I get quite a few orders from America just because they find me on the internet and that's the base they get sent out from'.

The designs are European Design Registered. Ben looked into patenting but copyrighted his design instead as it was more appropriate. The end of September this year is a big turning point for Ben. He will have a new website to sell his work from, a new company name and branding to go with it, he has just moved into a new office and his new product will be launched soon. Aqua Paint is a painting activity product which will be launched in October. It has been manufactured in partnership with Barchester Healthcare who is sponsoring the manufacture of Aqua Paint and has also tested the product in their care homes. They also gave insight into the medical implications and factors during the product development stage. 'In return for that they are getting quite a few products, they'll be on my website/product and my press release etc.

Ben has won the South East heat of BusinessZone's The Pitch 2010, in association with Yell and goes through to The Pitch grand final in November where he will be competing against three other entrepreneurs for a £50,000 business support prize package. In an article posted on the BusinessZone website, Competition judge Doug Richard, who was also involved in The Pitch 2009, said: 'It's very admirable what Ben is doing. There's a business there. It's very clear to me that he's hit on something'. Helen Stevenson, fellow judge and chief marketing officer for Yell, the competition's main sponsor, added: 'I was really touched by the genesis of the idea and I think Ben has really thoughtfully and cleverly designed something that was simple and extremely profitable. He's got a really simple product with a very high margin and a great design'.

Ben intends to carry on with the project for the next few years; he has plans for another couple of products for dementia. He also works on a few projects outside of the puzzles with his other company 'Future Industries', which he says 'is also going quite well, we just got funding for that'. The idea for the company started at

University also. It was with his housemate who was a really keen recycler but Kingston Council wouldn't take their plastic so they basically had huge pile of plastic in the corner of their kitchen. He and his flatmate decided to do something with the plastic stockpile. They began by melting plastic in a pan, which was not very safe so they progressed onto the 3D workshop where they melted it down, played with presses and developed a small-scale machine that can process milk bottles, plastic bottles and turn them into new products. 'At the moment we're getting a big machine made in Wales which is going to be able to do a lot of things and it will an educational tool. We're working with Be Inspired, we've got some meetings with to arrange some events where we take it around from place to place so people can see how the recycling process works, with a view to encouraging recycling. It's looking quite interesting so I'm keen to develop that further. The Dementia project is going really well and it's really popular; it's a lot of fun'.

Ben says that when it comes to enterprise teaching within the course; 'there wasn't a huge amount on that side of it'. The emphasis is to produce accessible ideas made out of appropriate materials. You pick who you are designing for and there is a valid reason for it. 'So it's looking at the right kind of materials and the right manufacturing methods to suit the market you're going for. Enterprise is taught indirectly. It gives you more freedom to explore. It's when you go into industry that it becomes pretty important. It's always underlined but the consideration is more indirect. I suppose I had a lot of it with the Enterprising Graduate Award from 2nd year; that came with lectures and things so it was all about that basically, it wasn't part of the product design curriculum. I'm pretty happy but as I said I was doing the extra enterprise course alongside it. It would have been good to know, however unless it's a project that needs it, I'm not sure how important it is. It was really important for me'.

Ben's project began in his second year at Kingston University. He secured £5,000 funding from the University's Entrepreneurial Grant Scheme to pay for all the materials, research, prototypes, and marketing including a website. Professor Hilary Dalke, a researcher who specialises in inclusive design for dementia care at Kingston, supported and advised Ben with his project. "Devising special activities for people with dementia is a key part of their ongoing treatment. Ben's work meets a real need in dementia care products, not only for those with the condition, but for the families who need a more interesting and appropriate way of spending their valuable leisure and social time with their loved ones," she said.

Ben has gained European Design Registration for his puzzle concept which has now gone into production. He hopes it could also be useful for other

people who have suffered some degree of memory loss or diminishing vision. The puzzles have already attracted the attention of leading retailer John Lewis as well as the prestigious Audi Design Foundation.

Ben has won the South East heat of BusinessZone's The Pitch 2010, in association with Yell and goes through to The Pitch grand final in November 2011123123ENVIRONMENTTECHNOLOGYENTERPRISEHUMANC

to compete for a £50,000 business support prize package. Competition judge Doug Richard, who was also involved in The Pitch 2009, said: 'It's very admirable what Ben is doing. There's a business there. It's very clear to me that he's hit on something'. Helen Stevenson, fellow judge and chief marketing officer for Yell, the competition's main sponsor, added: 'I was really touched by the genesis of the idea and I think Ben has really thoughtfully and cleverly designed something that was simple and extremely profitable. He's got a really simple product with a very high margin and a great design'.

Developing such a project throughout his final year meant that Ben could work on a business start-up and also make a positive impact on the lives of those with Alzheimer's disease. Being exposed to exercises in entrepreneurialism in his second year and getting incentives from Enterprise Support gave Ben a head-start over his peers. While most students probably hadn't thought of avenues they could explore for their final major project, Ben already had his concept in the bag along with extensive research.

'A simple project built out of personal experience and focused research. The commercial success of the project was helped by Professor Dalke, Enterprise training and a minimal amount of seed funding.'

Peter Christian, Business Development Manager, Kingston University

Ben, now operating under the company name 'Active Minds' , has since developed another product, Aquapaint and both are directly bought through his new website. His business is now self-sustaining and he has

recently moved into a new office; a sign that his products are selling well.

While 'Ben's Puzzles' continues to be a commercially successful product; one must point out that every student is not guaranteed the same. It is very rare in a University environment that you will have a student with an idea which compliments the research work of a Professor. Ben's Puzzles highlights the strength of the resources provided by Kingston University in addition to teaching as part of a degree programme. The effectiveness of these resources is determined by those using them. Ben is a good example of a hard-working, insightful person who developed an idea as a result of personal experience and was lucky to have the appropriate people around him to support and nurture his idea into fruition. Whilst every student in the studio will receive the same amount of attention and tutorial support, it is the student who pulls in resources and uses them to their advantage that will succeed in most cases. With such resources at Kingston, Ben was wise enough to capitalise on the expertise. Not all students will have the confidence or foresight to do this. In this case, the real success of this project was the effective exploitation of resources, experts, funds from enterprise support and networking; all traits of a good entrepreneur.

'I like this project. I too have a lot of contact with older people including my Mother who has a form of dementia and lives in a care home. I feel infuriated at the treatment elderly people receive for the vast sums of money taken from them each month; a dreadful business scam. Anything that seeks to improve their lot interests me. Ben has identified a direction based around the fact that those with dementia don't make distinctions between items and colour can be a huge help in making sense of their world and allowing them to engage with it. Whilst I like his idea he would have benefited from further study before embarking on a business venture. The concepts scratch the surface of a potentially hugely beneficial pool of possibilities. It will be interesting to see if running a business and developing good quality design ideas, in an important area, can co-exist.'
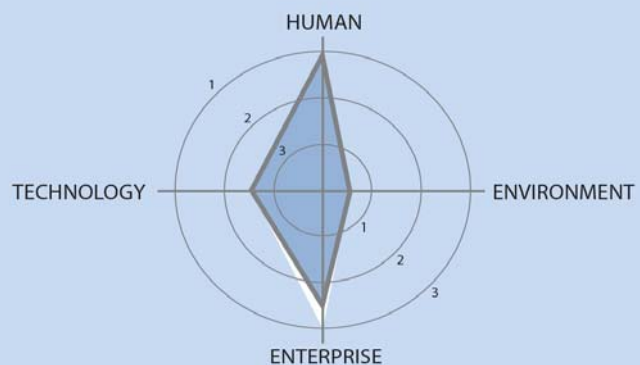
Adrian Stokes, Founder, ASA Designers

Enterprise Summary

Project profile
Social innovation based on strong external links and motivation. Supported by University academics and enterprise initiatives
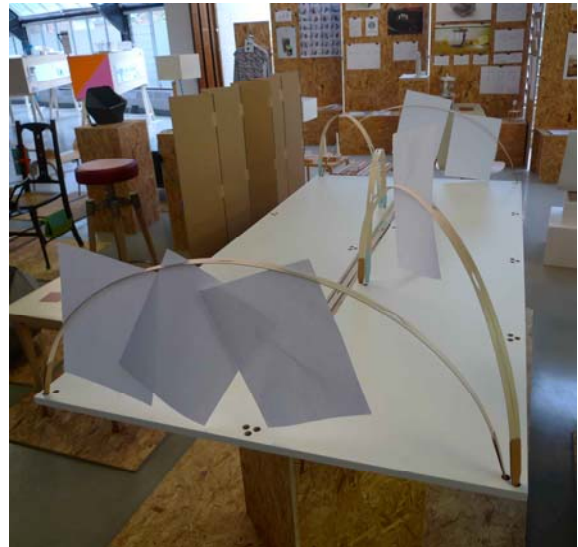
Enterprise opportunity
Earlier integration of enterprise support and awareness of opportunities by students

Build your own space

Personalised office workspace

Jung Hee Kim
Product & Furniture Design BA
Graduated 2009
Kingston University London

Summary

Kingston graduate designs table which allows users to either create a sense of privacy or open up work spaces by using dividers, and to organise any papers which are not immediately needed.

Designer

As the nature of business changes to incorporate more information based work (note the evidence from the statistics in the Office for National Statistics' (ONS) report, Home-based working using communication technologies, (http://www.statistics.gov.uk/articles/labour_market_trends/teleworking_Oct05.pdf)the extent to which employees need to be housed in an office is also changing. For businesses, having a workforce which is never static means they are in a position to utilise space differently and this might mean that they are able to reduce their overheads quite considerably; hot-desking also implies that there is a certain flexibility to the employee's presence at work. Working from home is a growing trend as a result of the greater technology in communications. Hot-desking refers to a situation where a physical space is available for anyone within an organisation to work on a flexible basis. It might be that a desk and PC is available to be used by anyone, or could be in the form of connection points at specified places where a worker can go and plug in their laptop or other mobile device. This table is designed for workspaces such as libraries and offices, allowing users to create privacy or open spaces using the dividers and any available paper sheets to build the right table for their needs. Workers can create a sense of privacy and ownership in one instance, then when working in a team can immediately open the space up. Jung says: 'In public places, we share many things with other people. For example, many things are shared in a work place, such as a table and its surrounding space. However, a high degree of concentration is needed during work hours, and for this reason, people prefer to have their own spaces. And for the same reason, a company sets tall dividers around the tables. Even though the company tries to enhance the concentration and increase the efficiency of workers by

building dividers, this makes it difficult for them to communicate with the co-workers, and can make them feel confined. Even if the dividers were made to solve those problems, they at the same time create other problems and cannot provide a comfortable feeling psychologically'.

Context

Companies in the UK spent £2,149 bn on purchases in 2008. £12.6 bn was spent on furniture and furnishings in 2009 in comparison to 2008 which was £13.1bn. One might speculate that there was a trend in 2008 for companies to re-examine their provision of workspaces and other facilities. With the current unstable nature of the economy, perhaps some companies are less likely to invest in office furniture.

Process

Jung did extensive research at the beginning of her project which informed her final design. She observed many different work situations and noticed that people were using dividers to create their own spaces and often used them in different ways. She examined carefully how employees use their workspaces, where the issues are and what they would like. After which she started the design process off by making 12 configurations of what this new desk might be and chose the one which was most practical. The dividers which are an integral part of the desk took some time to develop. Discovering a structure which could take A4 sheets of paper in a formation which would create maximum privacy with minimimal structure was quite a challenge. Material was a big consideration as it needed to look smart and also stretch, bend and weave into and across the table. Although the project took eight months from start to

finish, Jung wishes she had more time to investigate the materiality of the piece.

This design was made through the observation of the problems arising from the space being shared by users. This design could provide consumers with an opportunity to participate in the design of their workspace and would give them a greater sense of ownership; it would change the overall atmosphere of the existing office space which typically have an oppressive, arranged structure. This could also help consumers use space more efficiently.

Offices could benefit from a greater sense of flexibility when it comes to workstations. For some establishments considering putting a hot-desking system in place; this table is a ready-made for their cause.

If Jung was able to put this design on the market, she could benefit financially and gain considerable experience in the world of design. As she is driven by the enjoyment of the consumer, it would give her a valuable insight into the world of office furniture and workspace design.

Enterprise Analysis

This table was constructed in the 3D Workshop at Kingston University. It cost nothing to design/build as all basic materials were provided. She has no wish to commercialise her design and has moved back to Korea to pursue a career in design there. She says that there is growing opportunity for her profession there. Right now, Jung is working as a consultant for someone who is opening a new shop. There is a lot of money invested each year in office furniture; increased happiness produces greater results. Also, when a company invites a client into their office, they like to impress. With the newest trend in working patterns being hot-desking, these companies could attract employees and clients with 'Build Your Own Space'.

'With Yung Hee Kim, I think that conceptually, it is a very strong project and I think she was aware of the issues surrounding the project in terms of human needs and as it relates to privacy and space… perhaps the reason why it actually has no sense of enterprise attached to it is, in another respect it has no understanding of context. Context is implicit in everything the students within all levels of the course and as such we expect them to understand context as it refers to the user, as it relates to the manufacturer as it relates to the brand. Through that I think there is a real world and perhaps professional understanding of the project as the project's worth, the project's importance, the project's relevance. And when there is an absence of context, it allows the students to develop a conceptually strong project without any real world understanding, without any sense of context and ultimately that is going to limit the enterprise or perhaps the entrepreneurial potential of the idea.'

Simon Maidment, Course Director, BA (Hons) Product & Furniture Design, Kingston University

Although this project did not make it much further than the concept stage, the idea is a strong one and could be capitalized on, depending on whether the student wishes to or not. Jung has said previously that she wants the project to be a portfolio piece alone and there is nothing wrong about that. The purpose of a design project in University is not to make a profit; it is to explore all the aspects of design and develop skills to make you ready for the outside world. Whether one decides to set up their own business, join an existing practice or completely change careers is down to the individual. If the intention of the project is not to investigate potential enterprise, then the lack of market investigation is rendered invalid. This project is a strong argument for the conceptual project; not everything needs to be resolved to inspire.

I like this idea, or rather I like the approach and think Kim has hit on an interesting and fresh approach to a difficult problem. Adaptability is important in some areas of work and the need to change easily from private to more open forms of communication is one that deserves close examination. I like the fact that Kim recognises that there is further work to be done, but feel progress so far indicates a good grasp of the problem and an open mind when seeking potential solutions; a very well researched and well executed approach, with more to come.

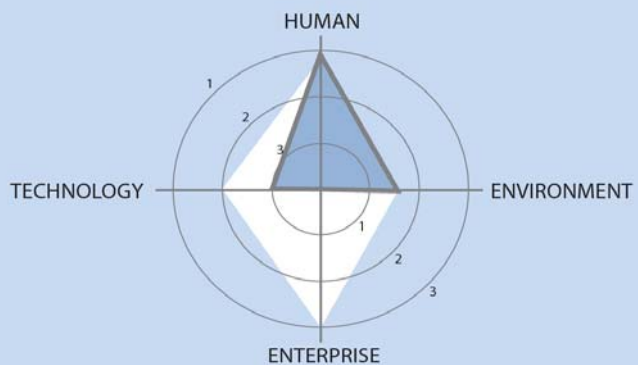**Adrian Stokes, Founder, ASA Designers**

Enterprise Summary

Project profile
The related business sector is vast. The student has a strong creative idea, but there is very little reference to the market context

Enterprise opportunity
Introducing the enterprise context to students without compromising their intuitive creative skills

Detail Originals

Innovative re-glazing of discarded crockery

Richard Brendon
Product & Furniture Design BA
Graduated 2010
Kingston University London

Summary

A skiing enthusiast has given a new lease of life to old crockery. Richard Brendon, a design graduate from Kingston University London has developed a glazing technique which revamps unwanted ceramics.

Designer

Richard was born in New York but grew up in Kent and since finishing his A-levels he has worked in a ski resort in California, travelled in North America, Australasia and Asia. He studied Politics and Economics at University in Manchester but decided it wasn't right for him. As art had always been his favourite subject throughout school, he decided to pursue a more creative line of study. As his artwork was always quite three-dimensional, he decided to pursue Product & Furniture Design as he says it 'seemed like a good way to channel my creativity to produce functional things'. Richard chose to study at Kingston because the course did not look too industrial and he wanted to be able to get hands-on and have freedom to explore ideas. When asked whether he thought he was a typical Kingston student, he responded: 'the course produces many completely different designers; there is an appreciation of narrative and smaller scale industry amongst many students at Kingston. I also appreciate these things'. Richard believes that people should consider the life span of what they design and not promote the throw away culture that we live in.

The Project

Richard developed a technique to re-glaze existing ceramic objects, keeping only a small detail from the original pattern. The aptly named 'Reveal' revives and adds longevity to previously unwanted and dated ceramics. 'Reveal' is aimed towards anyone that does not want to see perfectly good objects going to waste. It is easy for most people to connect with the project because when a small detail is kept from a very recognisable pattern it is still familiar but clearly more subtle and less offensive. The designer was interested in looking at objects which had lost their value and decided to find ways of giving them a new lease of life and add longevity. This worked very well with old crockery because many old ceramic patterns are very ornate and not to the taste of many people today. However there is some very beautiful detail within the patterns. 'Reflect', a project which stemmed from 'Detail Originals', is a range of highly reflective cups and saucers which can be used as replacement pieces for tea sets where a piece is broken or missing. When a reflective cup is paired with an existing ceramic saucer the pattern is reflected and unites them as a pair.

Context

In the first quarter of 2010, the UK manufactured £108 million worth of ceramic products. Out of that figure, the ceramic household goods manufactured were to the value of £39 million. In 2008, the UK manufactured £525 million of ceramic products. £192 million of that figure was household ceramics. In two years we have witnessed a massive downturn in the manufacture of ceramic items in the UK.

Process

The initial development work consisted of mock-ups made using spray paints. After exploring what the design aesthetic would be and what part of the pattern he wished to retain, he focussed on developing the technology which would enable him to re-glaze existing crockery. It took hundreds of glaze tests but he was finally successful. He spent three months on the project full-time and is still working on it, along with other ideas that have stemmed from it. He says that 'Major Projects don't have to end when University does; they just become more fun and less stressful'.

This range is aimed towards anyone who requires crockery. People that have an appreciation of perfectly good objects and interventions that can be made to make them more desirable will especially enjoy these items. It gives them beautiful crockery, which tells a story and is truly unique. The greatest advantage of this process is that less new crockery would need to be manufactured meaning that fewer virgin resources would be used unnecessarily. As Detail Originals only re-glazes existing objects, the energy consumed in manufacture is much less than producing new items; putting less strain on the environment and benefitting us all. Charity shops and car boot sales, where most crockery ends up could see a rise in demand for incomplete sets of crockery which in turn could generate increased sales and this in turn could benefit the local economy.

Enterprise Analysis

Richard has successfully developed a technology which is truly unique; socially aware; environmentally friendly and with potential economic value. The idea behind the project is simple and straightforward, but to actually realise the concept is a great accomplishment and testament to his skills and perseverance. Considering the role of charity shops in up-cycling of this nature could lead to a business model which can also benefit the lives of those the charities support. It could also reinforce the need to recycle and perhaps encourage it, for a positive return. The environmental impact this could have is considerable; fewer resources consumed; less energy used to refine the resources; less harmful gas emissions; smaller carbon footprint; healthier environment. Crockery is something that is seldom unique and is valued in three categories; quality, age and rarity. Richard's process creates unique items from mass produced patterned crockery, a pattern which is familiar to the consumer, but is one of a kind. The entrepreneurial potential with this range and the related design projects Richard is developing is rather considerable. Thus far, he has made great efforts to promote his work. He identified retailers he thought would be interested in his work and sent them invitations, which he made himself, to New Designers where he exhibited in July. He has a website which also promotes his designs and his other passion; skiing. He is constantly looking to network and is going to open a market stall/ Café gallery space outside a pub on Portobello Road.

'This is an extremely inventive re use of old crockery to make a new type of product. Clear commercial potential in the finished items.'

Peter Christian, Business Development Manager, Kingston University

Detail Originals is a great bit of conceptual thinking backed up with thorough practical proving. His range is now being sold in Wolf & Badger in Notting Hill and also through his website. As well as this, his rejuvenated ceramics will be on display at this year's Ecobuild as an example of sustainable practice encouraged on the BA (Hons) Product and Furniture Design course at Kingston. As he is currently based in the US and his business is based in the UK, it is perhaps not the most ideal of situations in the long-term but it appears to be working for him at the moment.

'This is another interesting starting point with a noble objective. I'm not sure how the system works, but assume the intention is for a network of local shops or franchises offering the service. Sadly the reality is probably that a new range off the shelf in Ikea, made in China, will be far less expensive than a revisited original. But it's still an interesting line of thought and if, as appears to be the case, the masking of an old pattern can reveal an unexpected and truly original decorative motif this may well encourage customers to pay.'

Adrian Stokes, Founder,ASA Designers

Adrian makes a good point; the product is most definitely more expensive to produce than IKEA off the shelf ranges of ceramics. It is for that end that this product would be aimed towards the environmentally concerned, 18+ years with a solid income. It is fair to say that the market wasn't the principal consideration in the conceptual stage of the project although the context was highly considered and as Simon Maidment says, with a greater contextual understanding comes the opportunity for entrepreneurialism.

'I think that perhaps because we underplay the idea of enterprise and entrepreneurialism, because we don't kind of like mention the idea of money making we don't mention those things, I think perhaps the project is a little bit more perhaps sincere, or they come from an understanding which is the design's worth is more important than the student's potential income; that they can earn from the project.'

Simon Maidment, Course Director, BA (Hons) Product & Furniture Design, Kingston University

Enterprise Summary

Project profile
Highly innovative technical development, proven to a good level. A significant market sector, but the route to market is not clear

Enterprise opportunity
Taking a broader view of enterprise opportunities earlier in the process and having more support available to help exploit very strong innovation
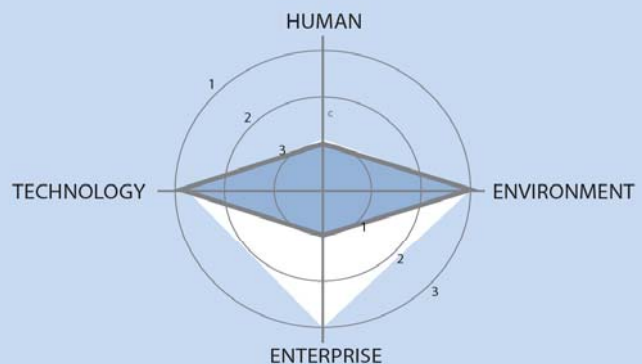
Kontour Blinds

Venetian blinds with a 'twist'

Helena Karelson
Product & Furniture Design BA
Graduated 2009
Kingston University London

Summary

Estonian-born designer re-invents the traditional Venetian Blind

Designer

Helena Karelson is a London-based designer who completed a degree in Product and Furniture at Kingston University London in 2009. She says that she is 'fascinated with light and the relationship between form and shadow'.

The Project

The Kontuur Blind was born from her particular interest in light, form and shadow. The slats allow light to filter through as with the original venetian blind but there is one difference; the slats are curved irregularly. Orientated in a horizontal position, the slats project 'a rich tapestry of sunbeams into the interior space'. When arranged vertically, 'the light from behind the window frames the blinds perfectly in a subtle, warm glow. Helena realised that there had not been much development on the venetian blind and felt that they had become quite boring as a window covering solution 'I saw the potential to design something interesting and beautiful'.

Context

The domestic furniture market, like many others, has seen a drop in sales in the last two years. The growing consumer trend is to invest in quality items and materials that will last longer. Sales figures for domestic furniture in the first quarter of 2008 were £3362 million. In the first quarter of 2010, sales of domestic furniture were £3207 million; slightly up on the same period in 2009 which was £3044 million but still nothing close to 2008.

Process

The attention that Helena has received off the back of the project has been quite impressive; this will aid future ventures. As a result of all this attention, Helena has been employed by various companies on a consultancy level, benefitting her professionally. This money could go towards further development of her range of blinds.

In 2009, Kontuur Blinds won Best New Blood at the D&AD Awards. She then went on to exhibit in Milan, along with some other enterprising graduates from Kingston University, generating much press and industry interest. In early 2010 Helena won the New Design in Britain Award for a development on her major design project; Warm Glow, also a blind. Helena is still developing her range of blinds. To date, she has not put her designs on the market. She says that her design has inspired a lot of interest from 'designers, architects, manufacturers, stylists and buyers from all over the world. It is a prototype. Many blind manufacturers in the UK and Europe have shown interest'.

Enterprise Analysis

It seems that there have been a lot of people who want to own a Kontuur Blind but can't because they are not on the market. One may think that with trend-setting furniture such as this, it is best to strike whilst the iron is hot. But it does not look likely that we will see Kontuur Blind in a shop window anytime soon as Helena is studying at the RCA this academic year.

'Like Ben, Helena has identified an interesting niche. The idea of making the blinds reflect light in unusual ways to make otherwise bland surfaces more like pictures has a lot of potential. Like Ben she's made a start and without seeing the objects first hand it's difficult to judge how successful her first ideas are, but I like the effects evident in the photographs. What is obvious is that not only is there a design challenge but a manufacturing and functional one and the three are going to require equal care and attention if a good idea is to become viable. Its early days from the evidence here.'

Adrian Stokes, Founder, ASA Designers

With such potential and press attention, it is surprising that Helena hasn't brought the blinds to the market yet. She doesn't seem to welcome the exposure either. This is the flip side of the coin; a graduate with a really successful product who shies away from getting the product made. This could be due to factors we are unaware of; perhaps all of the manufacturing companies decided that they couldn't produce her designs. Or perhaps she just wasn't ready to handle her own business. It is quite often the case that students are really confident when in the studio among their peers but once they go out into the real world, it can be a bit of a shock.

Helena's project was chosen along with a small number of others to be exhibited at the Milan furniture fair in 2010 where it received a lot of attention.

'Award winning product was admired by potential customers and manufacturers at high profile trade events in the UK and Italy. The product helped her get consultancy work with a manufacturer of blinds. Other companies were interested in licensing the design.'

Peter Christian, Business Development Manager, Kingston University

She received the same amount of support as any other student on the course; during her studies she completed modules on Professional Practice and Creative Careers Management along with Professional Portfolio. These modules are tailored to present the student with an overview of the possible avenues to explore upon leaving the course; what to expect, what you need to do etc. One could argue that it doesn't matter what the tutors do for a student if they are resistant to your suggestions, it is up to them. Whatever the reasons may be, Helena's blinds were designed, made, exhibited, featured in magazines and then disappeared. One might observe that this is a missed opportunity to capitalise on her invention, but there is still time.

Enterprise Summary

Project profile
Award winning project in a significant market sector. However the designer has limited interest in commercialisation

Enterprise opportunity
Enterprise factors are a reality of life. A very strong creative designer needs to develop an understanding of this context and confidence in how best to find outlets for their abilities
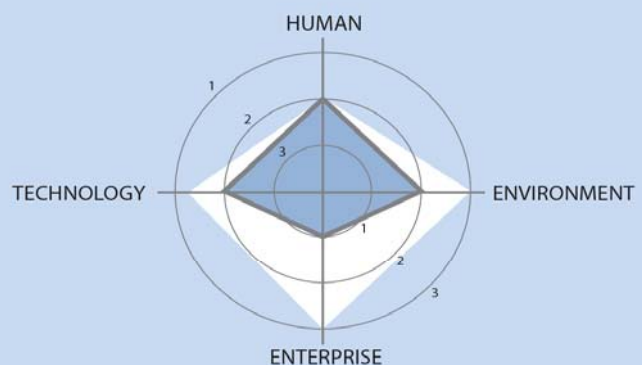
Mulch Men

Bio-degradable toys

Arran Evans
Product & Furniture Design BA
Graduated 2010
Kingston University London

Summary

Product Design graduate creates collection of biodegradable figurines for kids. Should the user tire of the character, they can place it in damp soil to uncover a whole new toy a few weeks later.

Designer

Arran was born in Dublin in 1985 and attended school there. After completing an art foundation course at Parsons Paris in 2004, she attended courses at Dublin Institute of Technology and Art Center Los Angeles where she discovered that she needed a course which focused on both the design and technology side of Product Design; this brought her to Kingston in 2007. 'I was very happy when I eventually discovered the course at Kingston because although I took the BSc route I was also given the opportunity to work along side the BA students and to take part in the same projects. The course therefore allows you to understand all aspects of designing a product from the inner workings, materials and manufacture to the overall design aesthetic' She believes she is a typical Kingston Student in that she has a big interest in materials and manufacturing. 'Kingston students are usually quite hands-on and like to take advantage of the wide ranging workshop facilities the university has to offer but because the course allows you to follow your own path we are also quite different in some aspects'. Evans prefers to approach design with a strong foundation in research of materials and technology. She is therefore happy to collaborate with manufacturers to produce final products though she enjoys the process of making prototypes. Arran believes that a designer has an obligation to intelligently and responsibly create products that will make a positive impact on the life of end users.

The Project

Mulch Men are a series of collectable toys that can transform from one character into another when planted in soil. They are made from a non-toxic biopolymer, which can biodegrade in your back garden. While doing research for a smaller project to try and tackle a world wide problem the designer discovered that some toys contain high levels of toxic chemicals. Although levels of such chemicals are regulated, recalls of a number of toys in recent times have shown that standards are not always met. 'A study undergone by the Ecology Center Michigan and The Center for Environmental Health California discovered that some toys contain high levels of toxic chemicals that can harm children. Some chemicals included arsenic, which may cause cancer, blood disorders, cardiovascular diseases and hormone disruption; cadmium which can cause adverse effects in the kidneys, lungs and intestines; and lead, which impacts on brain development and causes damage to the nervous system (Ecology Center, n.d.) Although in Europe there are regulations to control the amount of toxic chemicals in children's toys, toy manufacturers remain self-regulated, which has lead to many recalls in the past due to toxic toys; notably the 2007 recall of Mattel products manufactured in China that contained high levels of lead (Associate Press 2007).' Manufacturers are beginning to produce safe, environmentally-friendly toys for younger children but have not yet begun doing so for older age groups; parents have no choice but to buy toys for their children which may prove to be harmful. Mulch Men toys give the consumer an alternative by providing toys that are both safe for their children and for the environment, integrating ecological considerations with contemporary toy design to deliver a product that successfully meets user needs.

Context

Mulch men are aimed at boys between the ages of 8 and 12 and it's the ability of each character to transform that attracts them to the product. The decision was made to focus on older children as there are currently no safe, eco-friendly toys available for them on the market. Arran considered the needs of the parents in the design; they are attracted to the product because it's non-toxic, safe for the environment, easy to dispose of and subtly teaches their children about eco-friendly materials. An environmental enterprise can be defined as an organisation which generates income from an environmentally friendly initiative. The green economy has grown enormously in the last decade, both across the world and in the UK, and is projected to grow even more rapidly in coming years. The Environmental Goods and Services sector alone was worth $548bn globally in 2004 and is projected to reach $800bn by 2015. The green economy as a whole employs 400,000 in the UK. The overall retail market for traditional toys in the EU totalled €14.5 billion in 2009. This figure represents 1,400 billion units of toys. Toy shops remain the leading distributors and held more than one-third of the total EU market share in 2009, followed by super/hypermarkets and other types of retailers. In terms of sales the UK accounted for 20.5% of the EU market share for toys; the highest percentage in the EU. It is estimated that there are over 78 million children under the age of 14 in the EU27, 25.5% are between the ages of five and nine years. The toy industry directly employs nearly 100,000 people in the EU in production, research and development, marketing, sales, distribution, and many other services.

Process

In the first instance, Arran interviewed parents and children to find out what kind of toys they liked to play with, what they want from a toy and what parents' major concerns were. The interviews revealed that older children are attracted to bright colourful plastic toys and it was this that made encouraged her to focus on bio-plastics. Contact was made with many companies to find out the different properties that their plastics possessed. The idea for the final design came from the fact that all bio-plastics biodegrade. 'It occurred to me that when a bio-plastic biodegraded it could reveal something'. Once the design was finalised, Arran needed to find a bio-plastic that met the specific requirements of the design. After analysing the properties of a selection of plastics, Evans decided on one particular company.

At this point, the designs for the characters need to be finalised and manufacturing needed to be clarified. The shape and identity of each character was developed to try and form a solid group. Arran prototyped a few of her designs to be certain the size and final shape was appropriate. The packaging, landscapes, logo and POS were considered to finalise the whole design and the characters were professionally sculpted so the models would be of a high standard. It took about four months

to do all the research, finalise the idea and design each character and its packaging. Evans also worked on the project for another four months in conjunction with her second major project when she designed the landscapes, logo, POS packaging and made prototypes. When asked if there was anything else she wished she could have done, she said that it would have been good to have had the opportunity to pay more attention to the landscapes. They were an addition towards the end of the project so were overlooked in terms of finalised designs. 'Although the ideas are there, for them to be truly believed as a functioning part of the toy I think I should have made two functioning models, as I had only made a prototype of one'.

Product Benefits

The project benefits the environment, older children and their parents.

The children, from a health perspective, are at less risk as the bio-plastic is non-toxic and breaks down into carbon dioxide and water; this also benefits the environment. Parents wouldn't have to worry about whether the toys are safe or not and they can easily dispose of them by burying them in the garden or putting them in the compost making the toy an affordable, convenient and safe product. On a wider level, this project would also be an asset to the environmental toy market as there is nothing of its kind currently available. Arran believes there is a considerable opportunity to commercialise her concept and should this toy be put into production, it would benefit manufacturers, investors, parents, children, the environment and the market.

Enterprise Analysis

Considerable time was spent considering the consumer. The designer interviewed parents and children to see what they wanted and whether her design idea would have an audience. She investigated toys that were already on the market to discover that there was nothing comparable to what she was proposing; encouraging the development of her design which would have little direct competition in the market. During her research, Arran approached Hasbro Toy Company and received valuable insight from them. A large sum of money was invested in the professional manufacture of a prototype to present the toy in its most genuine and impressive form. Arran set up a website to promote her designs and ideas on the internet. She has received a lot of media coverage with Mulch Men featuring in National Geographic Kids magazine and on e-zines such as Creative Boom. She exhibited at the Kingston Degree Show and also at New Designers where she was approached by Hasbro and Lego. She hopes that the merit of her project will result in a job as a toy designer. She does not wish to launch the product on the market independently. This is an understandable decision as the toy industry is incredibly competitive and sales are considerably greater for better known brands. If her design was to be endorsed by Hasbro for example, it would have a much greater chance of being recognised and could also promote Hasbro as a leading environmentally friendly toy brand.

This project has considered many aspects relating to enterprise; self-promotion, sourcing materials, investing in prototypes and approaching companies in the chosen market. Perhaps a little more attention could have been paid to the specifics of her target market – toy/environment. Research focussed on the technical aspects/properties of the material and usability/human interaction. A more detailed outline of the cost of manufacture, selling price could have solidified this project as a strong business opportunity.

'As I understand it a biodegradable polymer is moulded in the shape of a figure and if left in the ground the outer skin of the figure degrades to reveal a new one underneath. Either that or you just mould your own figure and if you get fed up with it you plant it so it disappears altogether... However an interesting thought, but one I would have liked to have seen guided towards a solution that might have actually been worthwhile. I have visions of the revealed product and its forerunner both being half digested and the end result looking like a biological experiment which went wrong. On the face of it Arran was encouraged to finish something that hadn't really started and the end result lacks some credibility.'

Adrian Stokes, Founder, ASA Designers

Research into bio-polymers is still in its infancy so the likelihood of getting such a product on the market right now is very slim. This is a very forward-thinking project and as such could be seen as not very relevant to today's market. The project may not be to everyone's taste but one cannot deny that concept is a carefully considered combination of beautifully executed final objects in response to identification of a significant environmental issue; plastics in children's toys.

'This is an inventive use of materials to make an environmentally friendly toy for children. A potentially huge market with interest from large toy brands.'

**Peter Christian, Business Development Manager, Kingston University**

Enterprise Summary

Project profile
Very enterprising student has explored a broad spectrum of issues with an innovative concept. She's created many opportunities for herself and the concept

Enterprise opportunity
Scope for mutual benefits from better connections with Universities' research expertise
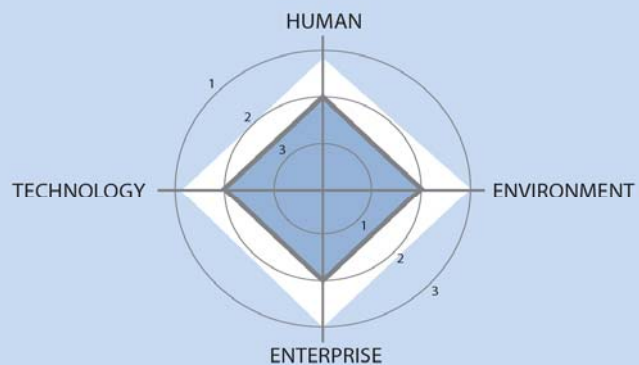
ObliqO

Personal self powered Urban Vehicle

Michele Camerlengo
Product Design BSc
Graduated 2009
Kingston University London

Summary

A graduate from Product Design (BSc) at Kingston University London has designed 'ObliqO', an alternative to the bike or skate board. A personal self powered urban vehicle

Designer

'ObliqO' is an innovative recreational vehicle for the urban environment. It borrows its mechanism from a snake-board but it features a pair of 16-inch hub-less wheels for better performance on rough surfaces. Michele has created a man-powered vehicle which is fun to use; exercising the body's muscles is a happy side-effect. The designer says that most people thought the concept was impossible to actually achieve, this made Michele more determined to prove that the technology and design was possible.   He wanted to create something fun that would test his technical abilities as a designer. 'ObliqO' is a unique design which has been engineered for ease of use. The hub-less design of the wheels and the incorporation of these into a snake-board mechanism is a very complex task and is an advanced technology developed solely by the designer. Its manufacture required extensive use of the 3D Workshop at Kingston University, especially the CNC machine.

Context

The target market is sporting enthusiasts in their twenties with an interest in innovation and outdoor activities. The idea developed from the designer's observation of the limitations of skateboards and snake-boards. Research shows that about 6% of the UK population express an interest in extreme sports, but only 1% actually participate. The UK sports-equipment market is extremely fragmented and difficult to define, but Key Note, a market research company, values it at £1.1bn in 2008. Total UK sales of products in the Sporting Equipment industry in 2007: £311,190,000.

Process

The development of the 'ObliqO' began six months before Michele began his BSc at Kingston. When he decided to pursue it for his Major Project, he used the extensive facilities in the 3D workshop where he made parts for the prototypes. Also key to the development was Computer Aided Design (CAD) programmes where he designed the above parts before manufacture. This project also required the use of external manufacturers. 'ObliqO' is still in development as Michele is dealing with the production of new prototypes which will be ready by the end of August 2010.

Product Benefits

'ObliqO' requires the use of balance and movement. This would benefit the end-user in a physical capacity and also would provide entertainment. It expends only the user's energy, and expels no harmful gases into the air, making it healthy not only for riders, but also the environment.
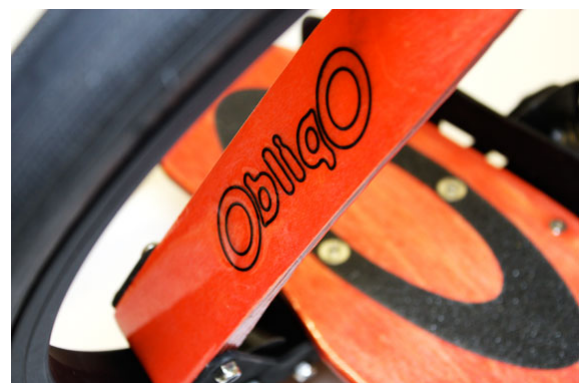
Enterprise Analysis

Michele designed the parts of the mechanism he could not make using Computer Aided Design (CAD) Software and contracted external manufacturers to produce them. 'ObliqO' has the potential to generate sub-cultures in the way that the snake-board, skateboard, surfboard and snowboard have. It could affect a generation. As it stands what we do know is that the vehicle is good exercise, fun, technologically complex and a healthier way to get from A to B. The 'ObliqO' does not work without human interaction; the only energy consumed is that of the user's. There are no fumes polluting the air. Although it is not a simple design, at the end of its life, it can be disassembled. The different materials which combine to make this vehicle are not bonded in such a way as to prevent re-use. Michele exploited the internet to promote his designs. He designed and developed a website where he displays his portfolio of work and also made a video of the 'ObliqO' in action which he posted on the web. This was very successful and generated a higher than expected volume of visitors and coverage in the blogosphere, which in turn brought more traffic to his website. Michele received great support and mentoring from Enterprise Support at Kingston University as a result of winning the Enterprising Graduate Award in 2009. The money given to Michele for winning the Award gave him the opportunity to develop his project thus far. He took part in a one-year mentoring scheme, attended regular meetings with other graduates/entrepreneurs and received expert input on aspects of developing an enterprise. He continues this relationship and enjoys the expertise provided and the opportunity to network. He has invested approximately £8000 in the development of the 'ObliqO' and it is getting more expensive as he outsources more work and deals with IP protection. 'ObliqO' is a registered design in the EU, US and Japan. Michele intends to licence his idea to a manufacturer and use the experience gained to inform other projects.

Analysis

Although Michele has benefitted from the support of Enterprise at Kingston, Obliqo is not on the market.

'Variations of skate boards aren't new and this idea is from a long line of products that have singularly failed to improve upon the original. I have to say it's difficult to see how it will allow a greater range of stunts and activities, or be safer whilst performing these tasks. I remember a character at the RCA developing a fully enclosed motorbike which was patently an evolutionary reverse gear and this looks as if it's on the same lines.'

Adrian Stokes, Founder.ASA Designers

The particular enterprising quality Michele possesses is determination. When told something couldn't work, he set out to prove it. He is keen to participate in any event whether it be a skills workshop or talking at a symposium in front of a crowd of academic delegates.

'An ambitious self-initiated project aimed at a crowded market. The designer has continued to develop and invest in prototypes of the product... He benefitted from winning the Enterprising Graduate Award.'

Peter Christian, Business Development Manager, Kingston University

Michele is another example of a student who pulled together the appropriate University resources in order to achieve his goals. It was never Michele's intention to sell lots of the vehicles; it was always more about developing the technology and making the idea work rather than actually making a profit out of it. In the context of an Enterprise study, it can be easy to forget that Major projects are not only final pieces; they are products of experimentation, learning and developing. In some cases people may choose to take on complex projects in order to prove that a technology is achievable; just as much as one may choose to design a product which can immediately be sold to generate profit.

Enterprise Summary

Project profile
Distinctive concept with well resolved technology. Highly enterprising student combined with good support from university enterprise and facilities

Enterprise opportunity
Individual enterprise qualities may have at least as much value as the enterprise potential of the concept and should be recognised and developed alongside a 'traditional' focus on the artefact.
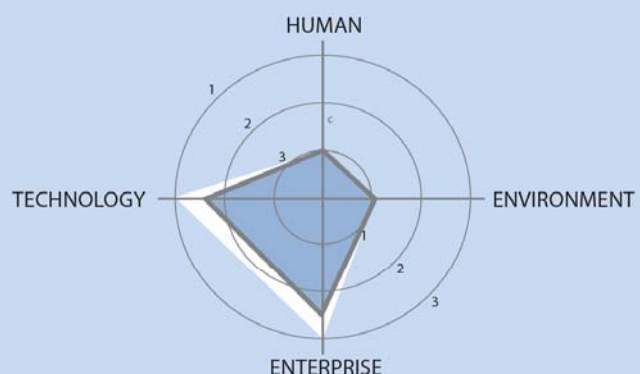
Spun Metal

Exploration of metal spinning in a series of objects

James Michael Shaw
Product & Furniture Design BA
Graduated 2010
Kingston University London

Summary

Winner of 100% Design Award at the annual New Designers Awards 2010 has developed a series of spun metal objects in an attempt to highlight and revive a traditional manufacturing process which is often overlooked.

Designer

James is a young designer living and working in London. He recently graduated from Kingston University where he studied from September 2006 until June 2010 with a self-imposed year in industry between his second and third years. When asked why he chose to pursue design, he said he has a 'need to create - tempered by a desire for the functional'. He chose to study at Kingston on the recommendation of others, the facilities and it's proximity to London. He believes that the role of a designer is to change and improve the world around them.

The project

'Spun Metal' is an exploration of the process of metal spinning resulting in three objects. The aim was to produce objects which exploit and celebrate the process whilst being pleasing to use and own. The first item in the series is 'Indoor/Outdoor table' which has a three-foot spinning as the top of this table; it is strong and lightweight. The process of spinning gives rigidity to the thin sheet metal which has been shaped into the table-top. The powder-coating provides weather protection for the traditionally jointed leg structure underneath which accommodates the use of a wood with a stronger sense of quality and longevity to the whole object. The top can be removed from the legs with ease and both can be stacked making it suitable for use in cafes or restaurants. The second item is 'Dustpan and Brush' which is a spinning cut in half and shaped. This produces two dustpans. A carefully placed hole creates a seat for the brush and allows the object to be hung on the wall. The brush crafted from ash with dyed natural bristles nests comfortably into the shape of the dustpan. This is intended to be a product for life which the user will cherish for its quiet beauty and functionality. The third

item is 'Ball Joint Lamp'. A hemispherical element sits inside a base creating a ball joint that allows for simple and pleasurable adjustment of angle. A gloss powder-coating on the upper element reduces friction and a fabric covered twist flex gives a nostalgic quality affording the object a sense of timelessness.

Context

Many people believe that Metal spinning is one of the oldest methods of forming sheet metal invented by people in Ancient China. The unique thing about metal spinning is that it is unlikely that any other technology could replace the process of metal spinning to produce the same/better results. Spinning is either done by hand using a lathe or by machine using a CNC Lathe. The spinner can transform a flat piece of metal to create the shape they want, much like a master potter at a wheel. As with other manual trades, quite often the tradesmen come from a long line of skilled metal spinners. If this traditional method of small scale production is not encouraged, we will lose it to CNC machines and a part of British history will be forgotton.

The decision to focus on durable essential household items is a wise one. With the uncertainty that faces the economy at the moment, it has been observed that there is a trend towards people spending on lasting products. Stephen Robertson, Director General, British Retail Consortium says that 'Talk of public spending cuts is unsettling customers and they are concentrating on essentials'. UK manufacturing is dealing with an uncertain future and is massively over-shadowed by manufacture in other countries such as China. Pricewaterhouse Coopers UK (one of the world's largest

professional services firms and the largest of the Big Four auditing firms) say that 'effective innovation in the UK manufacturing industry is key to succeeding in a competitive market'. Sales in the first quarter of 2010 for household utensils grew to £889 million from £877 million at the same time in 2009. Figures were much stronger for the first quarter in 2008, at £1032 million.

Process

James says he wanted to gain a comprehensive in-depth understanding of a process that could result in designed objects which were easily batch producible. He undertook a rigorous process of design involving sketching, computer modelling, sketch modeling, fine model making, prototyping and manufacture. The work on this project spanned from February to June 2010 and Shaw is adding to his collection in preparation for exhibition at 100% Design 2010.

Benefits

The designer hopes that 'Spun Metal' will benefit those who use the objects in the series. They are modern items which are informed by a traditional manufacturing process. Investment in such a product would also be economically beneficial to the end-user as they will retain their integrity longer than their plastic equivalents. The British manufacturers would also

benefit from increased demand for their trade and this would contribute to the local economy.

Enterprise Analysis

'Spun Metal' is very much process-driven. The technology exploited to inspire and create these designs is not new. The way in which this more traditional form of manufacture has been used to create innovative products is commendable. It is not only the development of new/unique technology which can benefit the lives of people; it is the rejuvenation of old methods which can benefit the economy. Metal spinning is a manufacturing process which is said to be the first known means of forming sheet metal. James worked with a number of metal spinners; one of them is a fifth generation spinner. With a much lower population of manufacturers in Britain as people outsource to different countries, the traditional and culturally significant modes of manufacture are at risk. By aiming to highlight this problem and revitalise a dying trade, James is attempting to preserve part of British culture. We live in a disposable society where a dustpan and brush set can be bought for very little money but it is basic and usually made from virgin plastics. The objects in the metal spinning series are designed to be innovative, desirable, practical and durable items.

Whereas plastics are often down-cycled, metal can be re-used without loss of integrity. All of these factors lend themselves to a very enterprising major design project. Evidence of this is that James won the 100% Design Award at the New Designers Awards this year. His prize is a free stand at the 100% Design Exhibition 2010. Keen to capitalise on this opportunity, James has been developing more objects to add to his collection which he will show at the exhibition. 'With preparing the Kingston show for New Designers, I think it was really valuable for putting my show together'. The consumer trend is to buy durable essential items which they can look at in a shop/showroom; Jamie hopes to set up a showroom/shop and has recently been in talks with a well-known furniture store interested in his series.

Jamie took a year out to work with a designer-maker between second and third year. He believes that this helped him become the successful designer he is now.

'With James I think from the outset, he understood the sort of low-investment, scalable nature of the processes he was using. I think halfway through the third year he had meetings with Liberty, a very well respected furniture design retailer. He also had a year out working for a Designer-maker. So I think he was in touch with a way of working which based around the idea of; 'I may make it, or I may commission it's manufacture, but I am going to be involved in it's manufacture so from the outset he was working this particular way.'

Simon Maidment, Course Director, BA (Hons) Product & Furniture Design, Kingston University

The project itself has great integrity and a desire to sustain a beautiful and beneficial tradition. In contrast to Helena Karelson's Kontuur Blinds, Jamie designed something which was resolved and could be

manufactured immediately. This allowed him to take full advantage of the extensive press coverage which he received even before his degree show exhibition. From there he got stuck into preparations for the 100% design exhibition for which he developed & manufactured his spun metal range in only a couple of months. This was on top of preparations for another exhibition at MADE in Brick lane the same month. This shows his determination to succeed and capitalise on whatever opportunities come his way, as long as he can retain the integrity of his designs. Jamie also exhibited his products at an exhibition called 'Rare Gifts' in The Residence Gallery, Hackney. Here he had his 'Spun Metal' collection for sale and some other products. It seems appropriate that his work be sold in an Art gallery; each piece is unique, a one off.

'A lovely sensitive and instinctive feel for the processes and materials employed, as well as a keen eye for detail and a worthy recognition of the importance of using innovation and good design to breathe life into increasingly defunct UK manufacturing. An excellent project well executed.'
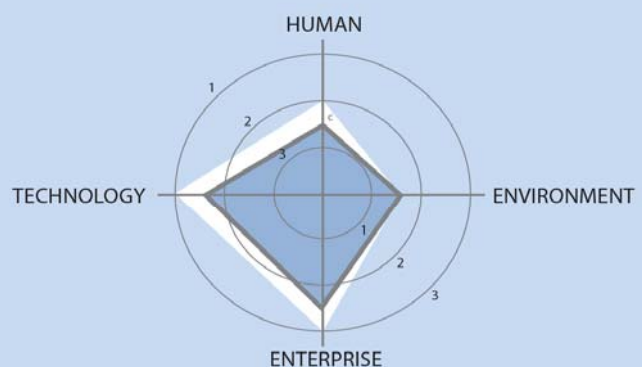
Adrian Stokes, Founder, ASA Designers

Enterprise Summary

Project profile
An award winning 'market ready' project achieving a good media profile, supported by strong links with industry throughout

Enterprise opportunity
Scope for the university to develop the links with the designer, project and industry

The Hoffman Series
Ethical Furniture

Leila Chouikh
Product & Furniture Design BA
Graduated 2010
Kingston University London

Summary
Young designer collaborates with the Hoffmann Foundation for Autism to design a series of furniture to be manufactured by adults with Autism.

Designer
Leila is a young designer with a passion for social design. She chose to study at Kingston because of the extensive facilities provided for students. She believes the designer has an obligation to produce a new generation of objects/ services which are culturally relevant and enhance peoples' quality of life.

The project
'The Hoffmann Series' aims to revisit the ethical side of the furniture industry; putting emphasis on the effect it has on the workforce, in collaboration with The Hoffmann Foundation for Autism situated in North London. Craft-based activities have been found to help the foundation's members by generating income as well as alleviating symptoms of autism by engaging with structured activities. The series contains three items of furniture; a candle holder, a desk-lamp and a side-table. Her research into the condition has revealed that people with Autism often experience side-effects such as stimming; a repetitive body action. The foundation of Leila's furniture series is based on repetition, thus providing a task which can alleviate such side-effects whilst encouraging pro-activity and a greater sense of self reliance. The series is manufactured using accurate jigs, straightforward tasks and simple joints which are repeated throughout the various stages of the process. Leila worked very closely with an autistic centre during the course of her project which lasted 8 weeks full-time. She produced the precise jigs that the members used to create the furniture and watched the furniture develop.

Context
A social enterprise is an endeavour which uses market-based research and analysis to discover innovative methods to procure financial gain for a social purpose or simply put; using skills to help those who are unable to help themselves. The Government now estimates there are around 55,000 social enterprises across the UK. These companies have a combined turnover of £27bn per year, account for 5% of all businesses and contribute £8.4bn every year to the UK economy – that's nearly 1% of annual GDP. Social enterprises can be non-profit or profitable organisations and commonly derive their main income from 'community or social services' (21%) and property (20%). A much smaller percentage of social enterprises trade in the educational sector (15%) or wholesale and retail (3%).

Process
The series is manufactured using accurate jigs, straightforward tasks and simple joints; which are repeated throughout the various stages of the process. Leila worked very closely with an autistic centre during the course of her project which lasted 8 weeks full-time. She produced the precise jigs that the members used to create the furniture and watched the furniture develop.

Concept Benefits
Individuals with autism learn by repetition; the more time they spend manufacturing these items of furniture, the greater their ability to work independently will become as they get used to the process. The income generated by this production force will help fund new activities. Collectively, these will enhance their quality of life by facilitating the connection with a wider community and an expanding range of experiences. The wider community will benefit from greater exposure to those with autism and will, by default, become more understanding of the condition. Should people purchase an item from the Hoffmann Series, they will be indirectly enabling the enhancement of the autistic people involved.

Enterprise Analysis

The technology used to manufacture the Hoffmann Series is simple and repetitive. Although some final year students might strive to use more advanced technology to exhibit the technical skills they have learned throughout their degree, it takes a brave person to design a series which is so simple and straightforward. It is this bravery which gives Leila's project such integrity. Without a design incorporating simplicity and routine, the Hoffmann Series would not have been the success it is. This project is very much a social enterprise. Leila has created and designed a means for low-functioning autistic adults to raise funds to support the organisation which looks after them. Leila has also organised a website for the series where people can view images of the manufacturing process and find out more information. The merit of this project is not informed by the amount of revenue generated for the designer/ manufacturers. The currency that this project generates is of greater value than the British pound; it is a greater quality of life for all those involved.

'Leila is a social designer who is not interested in personal profit but wants to use design and craft for the good of society. The final products are sensitive and intelligent but do not look institutional.'

Peter Christian, Business Development Manager, Kingston University

Leila invested approximately £200 into the project and has no intention to continue collaborating with the Foundation. Leila has strongly held views about the role of design and does not feel it would be appropriate to try and secure a high fee or negotiate a financial interest in the concepts. Where Leila could make an impact is in the provision of her ideas to many organisations for people with learning difficulties/disabilities. The idea of providing a means for dependent people to financially support activities which will make their lives more enjoyable is commendable and could be profitable.

'This is great; a truly useful exercise which will make a positive difference to the blighted lives of Autistic individuals. Clearly it's well researched, but she has the imagination and good taste to produce a series of objects that look useful, well designed and commercial. The project deserves to succeed and reading the document Leila seems to have the wherewithal to ensure it does just that.'

Adrian Stokes, Founder, ASA Designers

Perhaps Leila could have considered this broader potential and capitalised on it. A well-considered business plan outlining the social benefits could be presented to investors or loan providers. The number of investors seeking both social and financial returns on their money is growing. Charitable Trusts and Foundations are among the financial institutions that lend to or invest in social enterprises. In 2002, the Government aimed to highlight the importance of social enterprise. Former Prime Minister Tony Blair said: 'The combination of strong social purpose and energetic, entrepreneurial drive can deliver genuine results. But if the UK is to benefit fully, then I believe it is important that the Government seeks to do all it can to help the future development of social enterprise.'

In 2010, the Coalition Government released their 'Programme for Government'. Here they say that they will 'use funds from dormant bank accounts to establish a 'Big Society Bank', which will provide new finance for neighbourhood groups, charities, social enterprises and other non-governmental bodies.' It was reported in June 2010 that this bank will be available from April 2011. This will give opportunities to people like Leila to use their skills to help those who can't.

'I think if we started to run projects which were income based, which talked about the idea of making money first and satisfy that need over perhaps the needs of a brand, the needs of a community, the needs of something else, I don't think we would get as interesting projects.'

Simon Maidment, Course Director, BA (Hons) Product & Furniture Design, Kingston University

Enterprise Summary

Project profile
A student with a strong personal social agenda. Effective links with relevant external organisations resulting in an excellent example of social enterprise

Enterprise opportunity
Recognition of the broader forms of enterprise and the what this can mean for developing the enterprising individual

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Kingston University London

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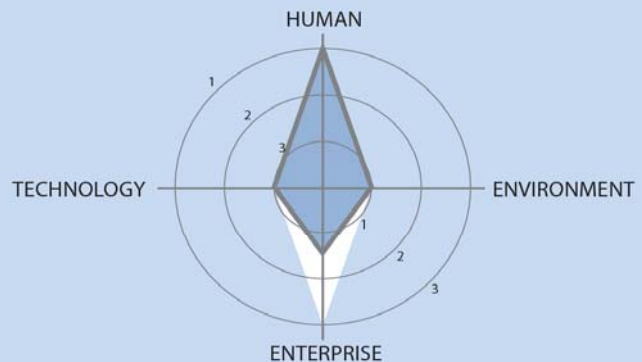
Blue Drop

Water Purification Device for Third World Countries

James Bartlett
Industrial Design and Technology BA
Graduated 2010
Brunel University

Summary

With a lack of access to drinking water a major issue for over a sixth of the world's population, this project aimed to find a simple and cost effective way of purifying river water. Chlorine was used as the purification method due to its low cost and the need for improvements to the existing apparatus for its use. The design strives to benefit users through health improvements, and also by offering entrepreneurship opportunities to sell the product.

Designer

After being driven to study design by '*frustration at badly designed stuff*' Bartlett began his undergraduate studies at Sussex university, and transferred to Brunel after realising he preferred the course on offer there. He feels the most important elements of a designers role are to co ordinate and refine, so it is not entirely surprising that Bartlett has spent his time since graduating refining the optimum chlorine dose for his water purification system. Bartlett chose to undertake this project as he felt it was rare in life that a designer has an opportunity to pursue a project of his own choosing for this length of time, and that he therefore had a responsibility to use the time constructively to develop a truly beneficial product. He is now employed full time by Arup, who were also involved in his major project.

Context

here are 1.1 billion people throughout the world who do not have access to clean water and are in desperate need of a way to make river water safe to drink. Although adding chlorine to the water is an cheap and effective way to do this it is not widely used due to the expense of the equipment and the difficulties caused by inaccurate mixing. This project aimed to tackle these issues and make chlorination a more available water purification method.

Process

Throughout the 216 hours that he calculated he spent on the project, Bartlett sought advice from students from around the world to aid in the completion of this project, many of whom he met at the International Development and Design Summit in 2009. As well as support from other academics, assistance was also provided by a Swedish engineer, who was able to help with fluid dynamics.

Despite the extensive development and refinement process that was undertaken the designer still feels the project would have benefitted form spending a period of time in India to get a better understanding of the problems faced by potential users, although to do so would hove cost considerably more that the £300 that has been invested in the project thus far. Bartlett was recipient of a 2010 Xerox award for innovation in honour of his efforts.

Enterprise Analysis

Enterprise is at the heart of this project, as it aspires to bring economic growth to communities through a micro entrepreneurs scheme involving selling the product. In this way, third world countries would stand to benefit financially, as well as the obvious health improvements bought by cleaner water.

The design featured in the Made in Brunel 2010 show, where the Xerox award was presented. Commenting on Bartlett's design Xerox said :

'This design tackles issues by using just three simple and easy to manufacture components, making it a simple and highly cost effective solution'.

This observation was echoed in the review of the design that was completed by Suprio Das, an advisor who was involved with the project. He commented that:

'as the product consists of just one part, then bits won't be lost or tampered with by the user, making it highly suitable for the target market'

The full details of the design have not been disclosed, and Bartlett has sought advice from an Intellectual Property lawyer, suggesting that he is wise to the potential value of his idea. He is committed to continuing to develop the project and continues to work on it in his spare time between other projects.

The group Bartlett worked with have recently received a $20,000 grant from the National Colligate Inventors and Innovators Alliance to conduct field trials in India but unfortunately due to other commitments he will not be able to participate. He remains hopeful that if the business model supporting the concept proves successful he may be able to return to work with the company as they expand.

The key to the potential success of this product seems to lie in Bartlett's identification of a need together with an understanding of the products potential environment. These factors have led to the development of a highly innovative and appropriate design solution. Not only was the solution appropriate in its material form, but the plans for a micro entrepreneurs scheme indicate a deeper understanding of the needs of the communities being designed for, as well as demonstrating an unusual and socially aware perspective on enterprise.

James Lamb, Associate Professor of Innovation at Brunel, applauds the impact of 'hero images', but highlighted the importance of ensuring the 'whole story' is communicated when presenting projects of this type. There could be a possible conflict here between the traditional design course emphasis on artefacts and what is explored here, which also encompasses co-creation, systems design and new business models.
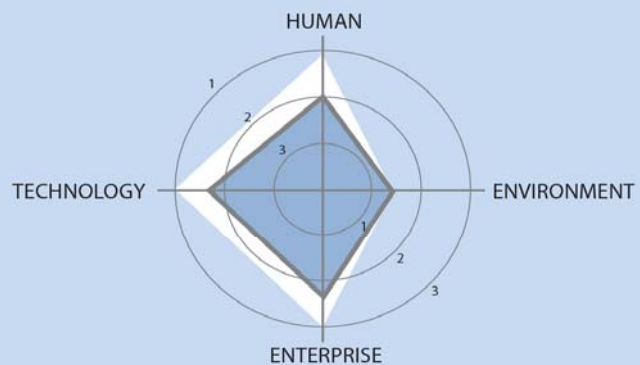
Enterprise Summary

Project profile
Example of social enterprise encompassing new business and manufacturing models as well as product design

Enterprise opportunity
Social enterprise projects often require increased emphasis on communication of more complex, scenarios and service or system concepts

Brollii

Rain Protection System

Simon Warne
Industrial Design and Technology BA
Graduated 2010
Brunel University

Summary

Standing in a rainy queue in Paris reminded Warne that the age old problem of umbrellas breaking in windy situations had not been fully tackled using modern materials and design techniques. This led him to undertake a major project to create an unbreakable umbrella.

Designer

From a young age, Warne has loved to come up with new ideas and designs and now feels that it is his role as a designer to develop products that will improve and enhance people's lives. He originally trained as a bespoke cabinet maker in Somerset, but the combination of engineering and design covered by the course at Brunel, drew him to broaden his horizons and return to education there. Warne is currently undertaking freelance design work, but is looking forward to embarking on four months of world travel from the end of September.

Context

Traditional umbrellas are known to be fragile and problematic in windy weather, yet this did not seem to have been fully addressed by designers prior to Warne's project. With climate change beginning to have a very real effect on our whether systems, there is a strong need for more reliable protection from the elements. Investigations into materials and processes led to the design of a bendy umbrella that can also be contained within its handle for storage.

Process

The inspiration for the project came to Warne while queuing for a museum in rainy Paris, he explained that *'I noticed everyone trying to get their umbrellas up and poking people in the eyes and flipping inside out and I just thought there must be a better way of doing this.'*

After choosing to focus on this problem for his major project, he invested just £80 in developing an unbreakable umbrella, which aims to appeal to all umbrella users, aged from 18 to 60. The resulting umbrella utilises flexible ribs which reduce the likelihood of the umbrella inverting or being damaged in strong winds. Additionally, the umbrella retracts back into the handle, meaning users do not have to carry a soggy fabric umbrella with them once the rain stops. Despite spending seven months developing the design, Warne would still have liked to have more time to conduct product and user research.

Enterprise Analysis

Since completing the project, Warne has applied for a UK patent. Despite being keen to expand on the product, he admits that whether or not he will do so depends on the results of his patent application. At the time of undertaking the project Warne was 27, roughly five years older than many of the students completing the course along side him. This age difference, and the added experience of his time in the working world, may way have influenced Warne's level headed and conscientious approach to the project.

Even if his patent application is successful, Warne is realistic about the fact it would still be a long time before the design made it to market, as manufacturers and financial backers still need to be found. The sensational amount of media coverage the Brollii has received- including articles on The Daily Mail and BBC websites- may well increase the chances of the necessary finances being found, however.

Warne has been described as 'enterprising' in a number of media articles, but feels that more information about applying for patents throughout the course of the project would have been beneficial to him, and would have improved his ability to live up to this description. Arguably, however, information was available throughout the course from the Brunel Enterprise Centre although perhaps this was not as accessible as it might have been or there was a lack of encouragement for students to adopt a more self initiated or enterprising approach to discovering the support which is available.
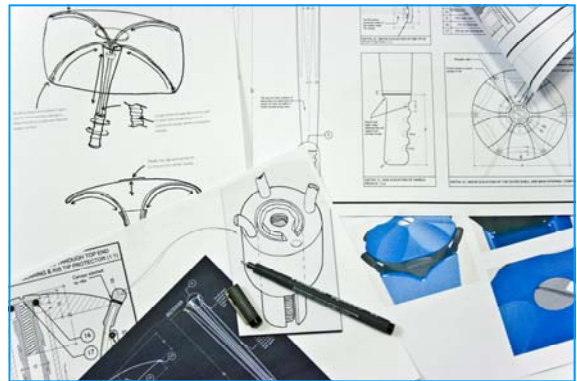
James Lamb, Associate Professor of Innovation at Brunel liked Simon's very practical, hands-on technical development of the concept, but wondered about the human use aspect – which ultimately would be a significant part of the product's potential market success. This view highlights the challenge of many Major projects of successfully balancing many factors.

Despite the interest in his project, Warne has taken four months off to travel, and seems calm about taking time out after university before progressing with the development and commercialisation of his design.
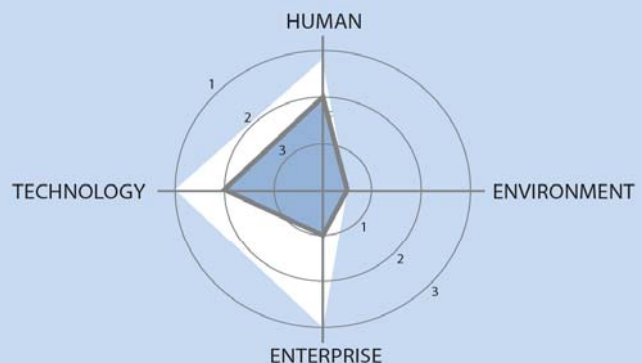
Enterprise Summary

Project profile
The project has lots of public appeal (and news coverage) and demonstrates great practical investigation of mechanisms

Enterprise opportunity
Potential commercial interest has been demonstrated. Progress is dependant on time and resources. Possible integrated 'after-care' from university enterprise offices?

Brunel UNIVERSITY WEST LONDON   Kingston University London   HEEG HIGHER EDUCATION ENTREPRENEURSHIP GROUP   Designplus

Crossed Wires

A social skills teaching aid for young people with ASD

Stephanie Fox
Industrial Design and Technology BA
Graduated 2010
Brunel University

Summary

A great number of people in the UK suffer from Autistic Spectrum Disorders (ASD) which is an umbrella term for a number of conditions, a common symptom of which is difficulty with social situations. The project focused on addressing this by creating a social skills teaching system, incorporating both online and offline elements.

Designer

From a young age, Fox has loved making things and so chose to study design at Brunel after being impressed by a tour of their workshop facilities. Although the majority of the four year course was based here, Fox also participated in a year long exchange program at San Francisco State University. She feels strongly that designers have a responsibility to create products that have a positive impact on the world, both environmentally and socially, and her choice of major project was driven by this belief.

Context

1 in 100 people in the UK have an Autistic Spectrum Disorders, including the designers cousin, and problems with social skills are prevalent among those affected. Many people with the condition wish to be more socially able and the project brief aimed to address this. The resulting design incorporated a real time device for use in uncomfortable encounters as well as a reflective online training program to address the problems that occur. The system aims to provide instant short term support, as well as an on going personal development program.

Process

In order to gain a better understanding of the problems faced by people with ASD, research formed a major part of the design process for the project. Due to the complex nature of the condition being studied, advice was also sought from a number of experts who had a far greater understanding of the topic, including academics from Brunel University and, most notably, Shelia Moorcroft Hughes, who is parent to an autistic son and the former chair of an autism support charity.

Throughout this process key considerations for designing for people with ASD identified. For instance, the real time device is incorporated in a bracelet in order to be discreet as people with ASD tend not to want to use assistive technologies that make them stand out, while the use of an online system was chosen due to the known trend that people with ASD have strong IT skills.

The thorough research that was undertaken was applied not just to the concept development, but also the aesthetic elements of the design. This included developing a visual identity for the system, including graphics for the online section and a visual model of the bracelet.

Enterprise Analysis

The design was evaluated by ASD expert Shelia Moorcroft Hughes, who had provided advice at a number of stages of the project. She commented that:

'While this has been designed with people with ASD in mind, there is significant potential for other people whose social skills are not as good as they might be…it could be useful for young offenders as part of a probation program, or for anger management'

Fox's project has featured in the made in Brunel show, where several visiting charities expressed interest in the project. As well as charities interested in Autism, the potential for the design to help other young people with social skills problems was also widely noticed, echoing views of Ms Moorcroft Hughes. Discussion about the possible uses of the product with a group from the charity Action Acton were very positive, but it was also commented that:

'[they] simply don't have the cash available to develop products like this, no matter how useful they might be'

Sadly, this was also mentioned by a number of other interested charities and seems to provide a great obstacle to developing the concept further- one that the designer does not think she could overcome.

While Fox would be keen to pursue the project and help as many people as possible, she is aware that she does not have the know-how to do so at this stage, particularly as developing the design would require input from a number of experts in social skills training. Although she feels that more advice regarding how to involve other parties – for both financial support and expertise in specific areas such as electronics - in the development of a project would have been useful, Fox admits that while at university her focus was very much on completing the requirements for her degree and she therefore did not conduct any additional independent research into market or development potential.

James Lamb, Associate Professor for Innovation at Brunel also highlighted the challenge of 'how would a project like this develop?' but also identified this as more of an issue of individual enterprise, or as he put it 'what does the student want?'

However, since graduating, Fox has been approached by 0_2, who have expressed interest in the design, and contact has been made with Autism charities in Ireland who they work closely with. Fox thinks it is unlikely that any further development will come of this, but feels that it is always good to receive positive feedback about a design. This development touches on one way in which third party help can be obtained, which was the missing link in developing the product further. It gives some understanding of how large companies may be interested in products with social impact for philanthropic reasons. It is possible that if more information about this were available to students then more major projects with a social or charitable focus- which form a large proportion of those undertaken at Brunel- may have a chance of being commercialised, and therefore have the opportunity to benefit their intended user.
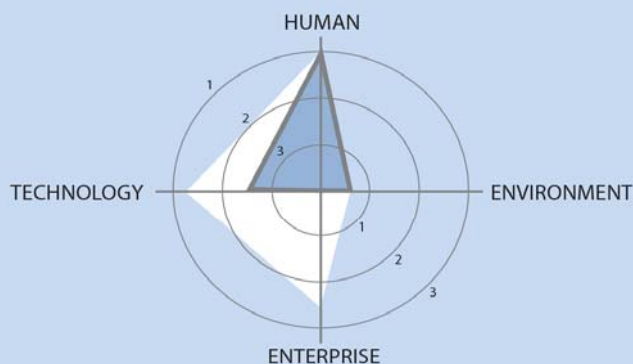
Enterprise Summary

Project profile
A social innovation project with good external links, but very limited exploration of the commercial potential for the concept

Enterprise opportunity
Broader thinking about all aspects of the project context would have enhanced the overall credibility of the work

Eco Chair

Single use eco-seating for the events market

Christopher Richmond
Industrial Design and Technology BA
Graduated 2010
Brunel University

Summary

A collection of waste corrugated card donated by the manufacturers EBP Ltd, together with the observation that there was a fundamental lack of seating at outdoor events inspired Richmond's EcoChair design. The product provides an innovative and environmentally friendly solution to this problem, as well as offering companies a novel and unusual means of advertising by printing on the board from which the chair is constructed.

Designer

Despite hating drawing and workshops, Richmond chose to study design at Brunel. Throughout his time at university, he developed in interest in branding which is evident in the EcoChair project. A love of money and a belief that it is the designer's job to make their clients happy drive Richmond's ambition to succeed. Since graduation Richmond has been pursuing a number of other business ventures, motivated largely by financial gain.

Context

The lack of seating available at outdoor events provided a clear gap in the market for seating which needed to be addressed. Environmental issues are at the forefront of the current zeitgeist, so it was felt that these should be at the heart of the proposed solution. As mobile advertising boards are sometimes not possible at outdoor events suggested, the creation of a disposable product from material that could be printed on suggested that there could also be a secondary commercial context for the design, as well as the basic requirement for seating. The resulting solution to these problems was a design for a flat pack chair constructed from recycled cardboard.

Process

An instinctive awareness of how the chair should look was present from day one. Ergonomic research and testing was conducted to establish the ideal size for the chair. The majority of the design process was spent using SolidWorks software to develop the 3D Computer Aided Design (CAD) model for the product, which consists of multiples of just four unique parts to allow it to be easily constructed by the user. This was then laser cut from the cardboard donated by EBP Ltd. Several hundred pounds worth of donated material was used in the design and development process.

The environmental impact of the product at several stages of its life was considered. As well as being made from material that is both recycled and recyclable, the design is also fully FSA compliant and uses vegetable glues and soya inks. The flat pack nature of the design allows for ease of transport and compact storage, which further reduces the chairs environmental impact

Once the design had been finalised, Richmond was free to focus on the packaging and graphic instructions that would be necessary to allow the user to assemble the chair in-situ.

The final design illustrates how the chair would function as both a seat and a means of advertising. Richmond would have liked to develop a means of printing the soya inks onto the cardboard, however, to allow the production of a mock up demonstrating what the product would finally look like.
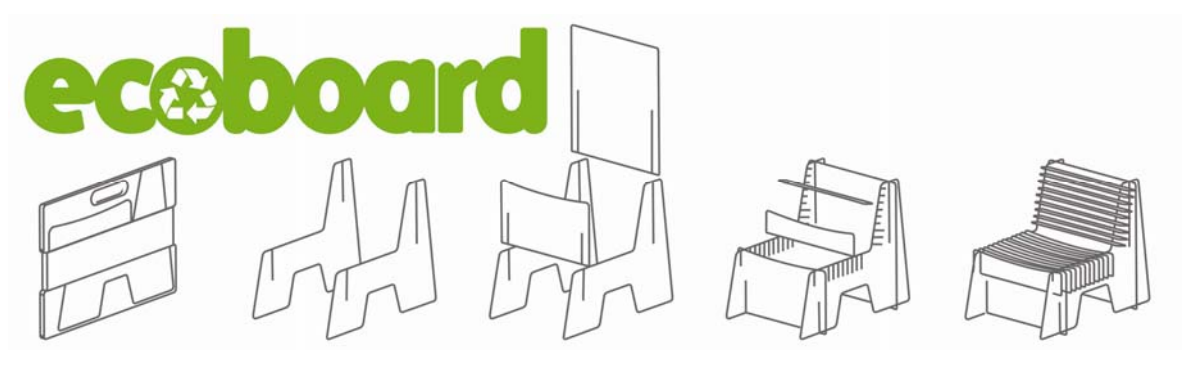
Enterprise Analysis

By the designer's own admission, this choice of project was directly influenced by a desire to produce a commercially viable product with genuine potential to make money. He proudly states that the chair *'is compact, comfortable, light, cost effective and in demand, and holds enormous commercial potential'*, demonstrating genuine confidence in his concept.

The use of one company's surplus materials to provide advertising space for other companies is an interesting business model, and one which could hold great potential as an innovative approach to enterprise. Ian Johnson- of EBP Ltd, stated that:

'What Chris has created using our product is fantastic, I never thought it would be possible'

The potential of Chris' design has been widely noted by people approached to review the product independently, as well as those involved in its creation. Rod Fountain of Cardboard Futures commented that the product was:

'A great concept and I look forward to seeing if the idea can be taken forward further,...we would be very interested'

suggesting that a collaboration between his company and Richmond that explored the design further may have been possible. Despite this interest and his original financial motivation, Richmond admits that he has no plans to pursue the design as he is now busy with other projects. He has stated that he would have liked to have been given more advice about whether or not his design held any value while at university, however, suggesting that perhaps he would have taken the chair development further had a money making opportunity been highlighted to him sooner. It is interesting to note that Richmond seems to be suggesting that he might have passively received the encouragement to explore the market potential, rather than it being a requirement, or that he might have explored this more fully in a self initiated way. James Lamb, Associate Professor for Innovation at Brunel comments;

'he might have looked much more broadly at the market potential – is this actually the best solution for the opportunity identified? To what extent did the Richmond seek out and test market potential – these additional external views might have sparked further inspiration. Has he checked the IP situation?'

However given the generally positive reviews of the design, Richmond's project seems to be an example of a situation in which the potential within a project may go to waste due to a lack of information and support. The designers interests in business and money suggest that he would have had the potential to pursue the business of product development successfully, had more encouragement or course requirement been in place.
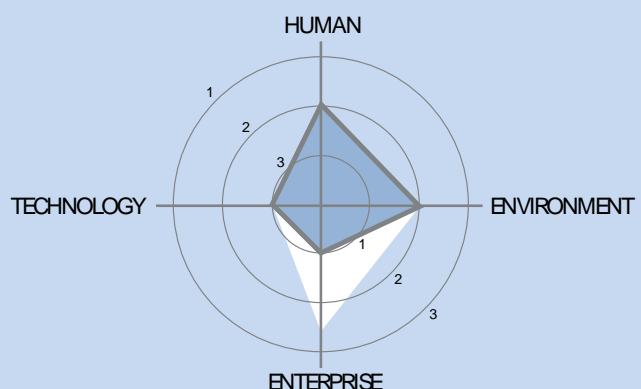
Enterprise Summary

Project profile
Enterprise content derived from personal interest and external collaboration but potential not fully exploited

Enterprise opportunity
Increased consideration of enterprise factors at outset could have led to greater external development opportunities

Soltan Plus

Providing a unique solution for the prevention of skin cancer

Alex Bygraves
Industrial Design BSc
Graduated 2009
Brunel University

Summary

A desire to work on an industry supported major project led Bygrave to take on the brief to create a smart packaging design for the sun cream market, in conjunction with Guys St Thomas' Hospital. The design aims to educate and inform the user, and reduce the number of skin cancer cases. In doing so it poses a proactive- as opposed to reactive- solution to the rising number of cases of skin cancer in the UK.

Designer

Having completed an art foundation course, Bygrave chose design as a degree course because it '*seemed like the perfect mix of engineering and art*' and was drawn to Brunel (joining in his second year, having completed the first year of his studies at another institution) because of its reputation and the quality of work produced. His belief that the role of the designer is to be a creative problem solver is evident in all of his work.

Context

Skin cancer affects 12,000 new patients each year, making it the most common form of cancer in the UK. Despite the links between sun exposure and skin cancer being well known, studies have shown that 50% of people do not use sun cream. The brief that was posed by Guys and St Thomas' hospital aimed to address this issue, and in turn benefit both the NHS and sun cream users. Bygrave's design for a sun cream bottle incorporates an indicator that tells the user how much longer they can safely remain in the sun.

Process

Following extensive research into the potential market and available technology, concepts were generated that aimed to use new technologies that were not currently on the market (under development by Guys and St Thomas') to increase awareness of skin cancer. The smart packaging design was then selected from these concepts and developed further.

Over the course of the nine months it took to complete the design, new bottle mechanisms were developed to protect the technology used in the bottle. The lid is both sand and water proof, and a mechanism between the two halves prevents the build up of sand and surplus cream by cleaning the nozzle between uses. Increasing the durability of the bottle so that it is reusable suggests that the design could have environmental- as well as health-benefits. These mechanisms were modeled using 3D Computer Aided Design (CAD) software and prototyped using rapid prototyping technology. Visual models were also developed to illustrate the aesthetics of the design. Despite the extensive design process that was undertaken, Bygrave feels that the project could have benefitted from deeper costing analysis, and further development of the functional prototypes.

Enterprise Analysis

The project originated from a direct collaboration between Brunel University and Guys and St Thomas'- a partnership which has proved to be successful for a number of years. The opportunity to work on this project meant that Bygrave was given a brief based on a market need that had already been identified by a third party, rather than having identifying a need more independently as many other students would have to. However, this kind of collaboration arguably allows a designer to put his or her talents to best use by enabling them to focus on creating innovative solutions to the problem they are presented with. As a result of this, Bygrave feels that his project '*provides a unique and intuitive solution for the prevention of skin cancer'.* This may well be the case, but it does leave the market opportunity question out of the equation. Should this have been part of the student's work? Possibly, James Lamb, Associate Professor of Innovation at Brunel commented 'Have all the market opportunities been explored?'.

Since completion Soltan Plus has appeared at the Made in Brunel, New Designers, DMY Berlin shows and at the London Design Festival. The design was nominated for the Business Design Centre New Designer of the Year award, as well as winning the Osbourne Clarke Creativity in Design prize. These accolades are a testament to the strength of the design.

A patent has been filed for the design and Bygrave continues to work with the hospital to develop packaging designs which have evolved from the major project. He balances this with other freelance work.

Due to the nature of the issues at the core of the project, the customer base is very wide, and the design therefore stands to benefit many people. This large user group also suggests the design could have strong commercial potential, particularly as the design address a growing trend amongst consumers for products that address their health and well being. Problems that fall into this category and align with current consumer trends- rather than those addressing more niche needs- may well provide a strong opportunity for students interested in enterprise to excel in this area.
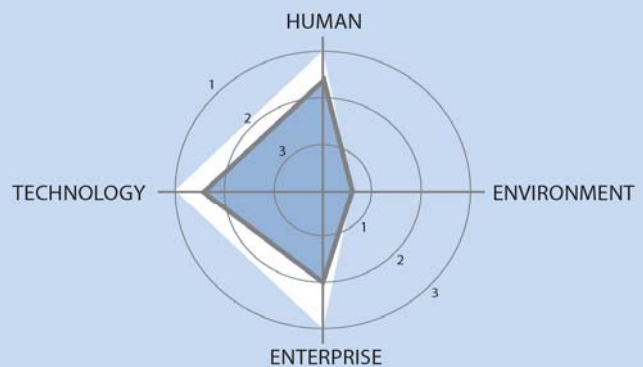
Enterprise Summary

Project profile
A project in collaboration with a major hospital provides a great commercial context and ongoing opportunities for the designer

Enterprise opportunity
Improving the management of similar relationships including fully involving any design staff involved

Tulipe
Feedback Plant Pot

Natalie King
Industrial Design BSc
Graduated 2010
Brunel University

Summary

A desire to produce a product that assists sufferers of macular degeneration led King to develop a smart plant pot, which indicates visually when the plant requires attention. Although the brief targeted a very specific market, the final design held mass appeal and achieved world wide media attention.

Designer

King does not consider herself to be a typical Industrial Designer, as she feels she is less technically minded that many Brunel students. Despite being more interested in design thinking and graphic solutions, she chose to study Industrial Design as she felt it was less restrictive than a straight graphic design course would be due to the broad range of modules covered, and that it could therefore lead to a range of career routes. Since graduation King has started work for Chanel in their retail and promotional design department.

Context

With more and more people affected by age related macular degeneration- approximately 50% of people over the age of 75, including the designers grandfather - this project aimed to provide people suffering with a hobby they could participate in with ease. The resulting design incorporates colour based and tactile feedback which is appropriate for people with sight problems, using them in a plant pot that aims to help the gardener understand the plants needs and successfully nurture it.

Process

King estimates that the time taken to complete her project was well over the two thirds of the working week that the university recommends. As well as researching and developing the product herself, King sought help from a charity called Thrive, who are the UK's horticultural therapy charity. Three meetings were held with a representative from the charity, who was able to offer advice and guidance based on their professional knowledge.

The outcome of the project has received very positive reviews, however the designer feels that a more comprehensive concept development stage could have been beneficial, and led to a more developed final design. Despite this feeling, King graduated with a first class degree.

Enterprise Analysis

King did not initially intend to expand on her project following the completion of her degree. Although the original brief aimed to help people suffering from macular degeneration, the final design holds mass appeal which has led to widespread interest in the design. An article about Tulipe in the Guardian newspaper commented that '*King, 22, designed the pot to help people such as her partially sighted grandfather continue to produce healthy plants. But it may also be a useful reminder for gardeners who are not very diligent when it comes to looking after plants.*'

This potential was noticed by the experts King worked with in developing the product, as well as the media. Wendy King, an expert in horticulture therapy products felt that the product was *"something that could appeal to a large scale market and could possibly be marketed towards forgetful and busy young people who would like to grow fresh produce but would be likely to neglect the seedlings without reminders."* It is interesting that the popularity and success of the concept lies largely with its appeal to the masses, rather than just with the intended user group of people with macular degeneration.

James Lamb, Associate Professor of Innovation at Brunel, re-iterated this point by commenting '*it doesn't seem as if Natalie considered the broader market issues or opportunities at the early stages of the project.*'

No design protection was sought as it was felt that it was of more use as a personal promotional tool. This proved to be true and after working with the PR department at Brunel University King's project has appeared in regional and national print media, including the Telegraph and the Daily Mail. Worldwide recognition has also been achieved, with art and design magazines from both China and Sweden also featuring the design.

Since this phenomenal coverage, talks have been held with a major online retailer who are interested in potentially marketing the product, suggesting that there may be more a future to the project than King initially realised. This retailer has only recently started

developing products themselves- having previously focused solely on selling designs produced by others. Despite this interest, King is realistic about the chances of her design making it to market and has expressed concerns about her earlier decisions not to protect her design, but maintains that the publicity she received as a result of not doing so has been extremely positive and has created opportunities that may not otherwise have been available. Despite her reservations, she is excited at the prospect of being involved in the future development process and hopes that it will be a positive and educational experience.

King's project is an excellent example of the benefit good PR and marketing can have in improving the commercial potential of a project, while her final grade demonstrates that there must be a strong, well thought out design at the heart of the marketing campaign order for it to be successful. The university's resources in this department gave Kings design an almost unprecedented level of exposure, but it also seems clear that advice about protecting her design throughout this coverage may have benefitted King.
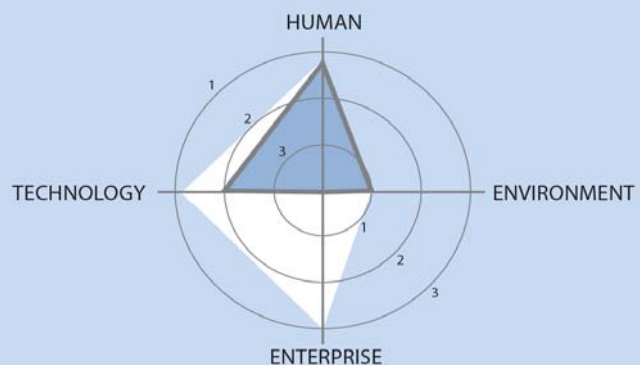
Enterprise Summary

Project profile
Originally with a social enterprise focus; phenomenal press coverage has led to real commercial opportunity

Enterprise opportunity
Considering broader enterprise opportunities earlier in the design process

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Variable Beam LED Lamp

An architectural lamp with variable beam angle

Matthew Nourse
Product Design Engineering BSc
Graduated 2009
Brunel University
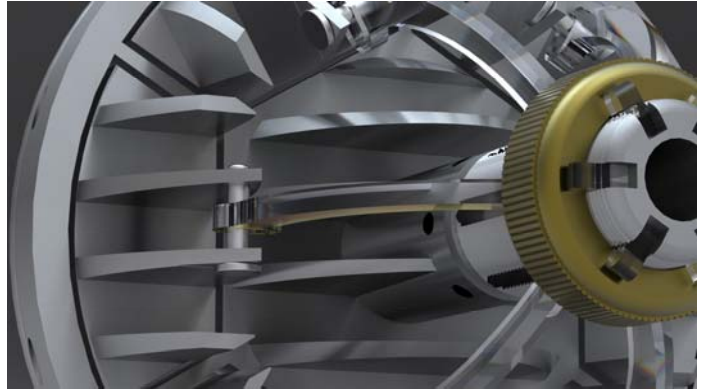
Summary

A year long industrial placement with Remote Controlled Lighting as part of Nourse's course highlighted a need within the Architectural Lighting market for a LED lamp that utilised Variable Beam Width technology. After confirming that there was indeed a need for this product with a number of industry contacts, Nourse went on to pursue the development of the lamp for his final year major project. The experience gained during placement, together with a design process that he described as *'research, develop, design, test, develop, design, test…'* enabled Nourse to produce a working prototype which confirmed that his design met the needs of the market.

Designer

An early interest in physics and D&T at school suggested design as a career path, something that was confirmed while undertaking a BSc in Product Design Engineering at Brunel University. As well as a clear passion for design, Nourse also has keen interests in the world of sport, music and economics, all of which contribute to his diverse design process. Nourse is currently employed by Remote Control Lighting- the company which led him to undertake this project.

Context

Although other companies had attempted create a light source that met the brief, experience within the architectural lighting world suggested that there was still room for improvement. As well as this market need, the use of LEDs resulted in the design of a light source that not only met the requirements of the users, but was environmentally friendly too.

The resulting design allows the angle of the LEDs to be mechanically altered, allowing the beam width to be varied. Additionally, the LEDs are controlled by pulse width modulation, meaning that the outer LEDs can be made brighter than the inner ones, to ensure that an even lighting effect is achieved.

Process

Industry experience while on placement - including leading the design of a remote controlled light fitting for Christie's auction house - gave Nourse the knowledge, skill and contacts required to undertake a major project such as this. The experience was used to directly influence the design of a product that was better than those that were available at the time.

During the project's seven-month time frame, a selection of virtual and physical modelling techniques were used to reach the final design. These included the use of Finite Element Analysis software, which saved both time and money by reducing the need for physical tests. Despite the savings made by the use of this process, it is estimated that £1000 was spent on the development of the product. The design and development process also included making mechanical and electronic prototypes, and the use of rapid prototyping techniques.

Although the project resulted in a successful and functioning prototype, Nourse still feels that it could have benefitted from being completed sooner in order to allow for more testing and re design stages.

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Enterprise Analysis

Remote Control Lighting maintained an involvement with the project throughout, and were also involved in the evaluation process, with Stephen Bradley of RCL commenting that:

'the market is just crying out for a product like this!'

This view is perhaps unsurprising given the company's advice on the project, but remains a positive testimony to the concept. As well as the strength of the concept, the product's potential for commercial success is undoubtedly enhanced by the projects execution. Dr Darren Southee, the academic who supervised the project, stated that:

'this project was well thought out from the start, and that's why it worked so well in the end'

and Nourse graduated with a first class degree. Since the completion of the project, it has been promoted on the Matt Design website, at the Made In Brunel show and in the online edition of Eureka Magazine. This article highlighted that:

'although the intended use for the product was as a variable spotlight for exhibitions, the design also showed potential for applications such as variable car headlamps'

This suggests that the commercial potential for the design may be even greater than was initially intended. It seems fair to suggest, therefore, that the identification of a clear market need combined with a strong concept gave Matt a good starting point for the project. However, it appears to have been a combination of his own hard work and the ability to take advice from experts in the field that have led to the design of a truly unique product.

A patent was filled for but this was recently abandoned due to the cost of the full patent process. Despite this, it is still hoped that the product will one day be manufactured with the help of RCL. Matt feels that more should be made of enterprise related subjects at university and aspires to own his own Design Consultancy, meaning that further enterprise may be on the cards for him.

'this looks like a really interesting and relevant technical development, but how well has the concept been communicated? From the material here we get an understanding of the detailed function, but this doesn't necessarily communicate the whole story' (eg the environmental benefits of LEDs and the ways in which this product might replace existing solutions)

James Lamb, Lamb Industries, Visiting Professor of Innovation

James' comment underlines the importance of communication within enterprising qualities – the importance of being able to anticipate the full spectrum of information needs of any particular audience. Matt does have very strong interpersonal communication skills, but perhaps these can be improved through added breadth and experience from exposure to the relevant markets.
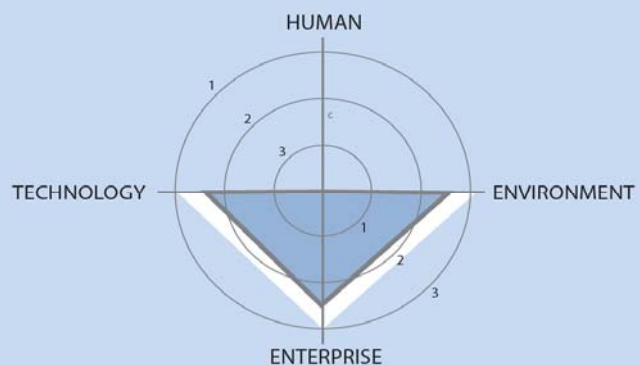
Enterprise Summary

Project profile
A collaborative project following a one year work placement. Strongly focused on a business opportunity

Enterprise opportunity
An example of how the student, University and company can build a mutually beneficial relationship

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