INTERNATIONAL CONFERENCE ON ENGINEERING AND PRODUCT DESIGN EDUCATION
2 & 3 SEPTEMBER 2010, NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY, TRONDHEIM, NORWAY

SOCIALLY RESPONSIBLE DESIGN: BREADLINE SHOES FOR CHILDREN IN INDIA

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ABSTRACT
Active learning happens to us when we participate in projects meaningful to us and engage with the real world. [1] Correspondingly, this paper explores the role of Design students in industry and research collaboration ultimately benefitting the poor. This paper presents a case study, a live client project initially aimed at free shoes to be offered to children in India as part of getting them to school regularly; drawing from comparative research expertise residing within the author's university on the footwear supply chain, waste management, knowledge transfer and the global market, and pedagogic research on engaging students in co-learning.
The case study reviews an ongoing undergraduate project with students in the United Kingdom, which has been taking place in conjunction with the British School of Leather Technology and a footwear manufacturer based in Chennai, India. In response to real needs, the students are encouraged in negotiating research across disciplines, shadowing podiatrists within clinical practice, and in creating prototypes of shoe and sandal parts. While students learn to develop their own designs into feasible samples, they were also encouraged to apply the relevant design and production methods, with consideration of appropriate technologies suitable for manufacturing in an Indian community or 'cottage-industry' context. Finally, the paper discusses the roles of students, researchers and educators in the project and the benefits derived from an association with multiple partners in the teaching of socially responsible Design. It will be shown that design learning at the University itself changes with new collaborations across cultures and integrated projects that are supporting kinaesthetic learning styles. A new generation of students will be equipped with skill sets to realise appropriate and practical solutions that can move people out of poverty in a sustainable manner.

Keywords: Appropriate technologies, footwear, live project, India, socially responsible design

1 INTRODUCTION

Approaches to ecologically and socially responsible Design have been outlined by Papanek [2], Polak [3] and Fuad Luke [4]. Appropriate technologies - utilizing the most effective means to address the needs of developing areas - are considered in current research in engineering and service design. Setiawan [5], Hong [6] and Rao [7] present examples of project-based learning where the stakeholders can draw lessons on promoting sustainable development. The British Council champions this process through the International Young Design Entrepreneur Award and exemplifies appropriate methodologies. [8]
The case study reviews a current live-client project at the University of Northampton with First Year Product Design undergraduate students, which was an integrated assignment with experimental design and design project modules. Live projects are design assignments set for students, where an actual commercial client or community partner requests input from students to solve a particular problem. Whilst adhering to the curriculum to develop design specific skills sets, the goal of this student assignment was to raise awareness of the importance of socially responsible design, sustainable and recycled materials and manufacturing associated with footwear.
This facilitates further the course team's emphasis on community regeneration, which has been embedded as the pedagogy of learning through live projects and enhanced the design curriculum for the last three years. This project enabled the course team to expand the scope of engagement and to consider design solutions for communities beyond the vicinity of the university and region. The broadened geographical scope of the project brought about challenges, particularly for the interaction

with the clients. In the course of the project, staff and students gained distinctive insights into industry and research relevant to sustainability and emerging economies, resulting in new product development. As we shall see, involving students in live projects has the potential to impact on communities in a real way. Primarily, this paper focuses on the impact on undergraduate learning and the enhancement of skills through live client engagement.

2 OBJECTIVES AND METHODS

Building on the design pedagogy of live projects, the author introduces socially and ecologically responsible design into the curriculum and assesses the development in students' learning. Examined were their research and investigative inquiry, human factors and cultural sensitivity, design realisation and prototyping skills, attention to manufacturing and material detail, all curtailed by resource considerations, social and economic conditions in the Indian community.

The effectiveness of the discussed project was assessed through (a) student written feedback, (b) client and other stakeholder feedback including a practitioner from a local shoemaking company, and (c) summative student assessment through staff. The client presentation and user feedback is currently awaiting. Throughout, work has been documented to be included in a further assessed item, a digital portfolio, which itself is part of the student personal development portfolio. Further, the client briefing session has been recorded and the podiatry clinic visits have been documented.

Facilitated were questionnaires originally composed by the Design department at the University of Brighton in 2006. [9] Eventually, they will be compared with feedback undertaken with students in previous live client projects with industry and community. A future evaluation could show longitudal impact as well as comparison across institutions, building on Viljoen and Hoskyns' [9] study on the extent of live practice in Design within UK Higher Education.

3 CASE STUDY ANALYSIS

3.1 Project description

According to the Green Chemistry Department at the University of York, "genuinely green products should ... start with sustainable raw materials and include green processing, as well as having a low environmental impact at end-of-life". [10] This thinking should apply to the project under discussion, which aimed to develop shoes that will be as widely available as possible, including use of waste materials, which is commonly available in the kind of locations where children have to walk a long way to school. In terms of the materials, re-use has been considered, for example, old tyres for soles and leather trimmings from tanneries and shoe factories, as well as biodegradable fibres, sustainable raw materials and including green processing, with a low environmental impact at end-of-life.

In the initial briefing, the client (Sateesh Jadhav of Gaitonde) outlined the 'Breadline Shoes' project as an initiative led by social responsibility: "Several school children in India who attend municipal schools go barefoot because they can't afford footwear. One of the main reasons their parents send them to school is because almost all over India mid day meal is given free of cost to municipal school children. Since parents have a very small income, they are keen children attend school to learn so that they can get basic education which is an important foundation. Also (the) mid day meal is very wholesome and this is something parents can't afford - therefore at least one good meal will help the child. For footwear, I want to make the upper using biodegradable jute, which can be sourced from gunny bags (made out of jute). The sole can be made from waste materials (bio-degradable) from textile factories."

The idea is to make the footwear cost effective through a design solution that considers the cost of materials and labour to put the footwear together. Because of their training, product designers frequently assume key positions as synthesists. They speak the languages of many disciplines and can frequently help both on a village level and with export markets. [2]

3.2 Student description and cultural dimension

The project was given to an undergraduate year one Product Design class with twenty-three male and two female students. The group included students of South Asian heritage, students from China and South East Asia, also ex-service personnel stationed in the region. So, the group consisted of peers that were aware of the social, economic and cultural dimension in a developing country. Thus, the students were paired up in the initial phase and tasked to familiarize themselves with rural India, using learning

resources, seeking contact with the South Asian community resident in the UK and international students from the region. For the staff, understanding was gained through interaction with an Indian researcher at the University whose subject was community development and education, and also met with a podiatry lecturer who had practiced in India on a leprosy station.

Figure 1. Client briefing, podiatry clinic, parts of sole and upper for shoe making

3.3 Stakeholder description and planning

For the University, the aim is to enhance students' employability skills but also to develop competencies in leather and other natural fibres, and strengthening existing networks in the footwear supply chain. Northampton is the historic centre of the British shoe industry and the University provides respective training, technical and managerial expertise, attracting a global clientele. Specialist research resides within a number of departments at the University, such as a Footwear Design provision, the British School of Leather Technology, the Podiatry Research Group, and the Waste Management Centre, all to which the students were introduced so as to gaining access and expertise.
The client, Sateesh Jadhav is the president of Gaitonde, a major shoe and leather goods manufacturer in Chennai, India. The company is a family business with three generation of directors linked with the University as well as its predecessor institutions as alumni. The project with the Product Design students was conceived initially through staff at the Leather School, and also built upon the established relationship with the Fashion department. The collaboration extends business imperatives. The project is of a philanthropic nature, benefitting the poor through self-empowerment; getting the community to make shoes, so they can get their children to school and receive an education. Students learnt about this aspect of Indian culture and the example, set by Mahatma Gandhi, of leading his country by living modestly in a self-sufficient community, weaving own clothes, demonstrating empowerment through craft within a community context [11].

3.4 Project milestones and collaborations

The client briefed the students when visiting the UK on the occasion of a trade fair. The project's context was illustrated through a video, called "Painless feet" [12], whilst focusing on leprosy related foot diseases and their treatment, it also informed about climate and road conditions in India, and showcased suitable footwear and their construction. For the client, it was important that these shoes would be as widely available as possible, perhaps through use of a waste material, which is commonly available in the kind of locations where children have to walk a long way to school. Colleagues in the University's Waste Management Centre helped students make informed choices by understanding the dimension of textile waste, glues and cements, biodegradation of natural rubber and the implications of recycling car tyres. This learning anticipates that live-cycle assessment methodologies will be part of skill sets for design graduates and parallels developments at other UK institutions. [13]
Conducted were visits to the University's Podiatry facility, located on a hospital site. Two groups of students in turn attended clinics on paediatric orthopaedics, were paired with Podiatry students and shadowed practitioners treating outpatients. Here, the project deliverables were discussed with experts, the impact of motion on the foot apparatus explained, initial ideas and assumptions tested. Students learnt about pressure points, customised foot beds, clinical conditions and techniques to remedy foot misalignments. Also, Design students witnessed the "learning at work" emphasis in Health studies and could relate this to their own studio-based education. Podiatry students, in return, learnt about Design specific methodologies, with students applying problem solving techniques, eliciting information and communicating concepts through visuals, concepts, prototypes and material investigation. This encounter instigated future inter-departmental collaboration (on developing diabetic footwear).

Subsequently, in the college's workshops and studios, soles, foot beds and insoles were created, and the construction communicated via exploded views, depicting components and materials. By using working drawing and templates, accurate prototypes were constructed from a sustainable source or recycled materials that reflected manufacturing and material detail. Having been assessed by staff, the students have yet to present their solutions to the client who would then appraise and advise the students on a possible commercialisation.

3.5 Project outcomes

Twenty-five individual prototypes of shoes and sandals were presented along with additional developmental models, including paper templates and samples where techniques were tried and refined. Altogether, around 75 samples and parts were created embodying student learning. Working drawings, material boards and photographs captured the making process. The outcomes included a) an ankle boot from jute inspired by trainer brands, b) moccasin constructions with latex rubber sole, c) sandals exclusively crafted from tyres, inner tubes and rim tape, d) slip-in pumps with leather trim, e) laced all-denim shoes and f) button fastened chappals using coconut shells as buckles. Leather-off-cuts and cotton were used as lining material. Furthermore, patchwork and sandwich constructions were explored; paper and hemp pulp crafted in to the foot bed; latex with sawdust moulded; and resilient plant fibres such as yucca and pineapple leaves were used for soles. Students decorated and branded their footwear with braids, or by block-printing patterns on the "upper" and using contrasting thread colours or traditional stitching techniques.

The students pointed out various challenges and limitations set by the briefing document. Their views were noted in tutorials, assessment and feedback forms. These challenges were identified and overcome. These constitute major achievements of the group's learning. Some students stated that design learning through *"problem solving and being more responsible in decision making"* took place and *"it was an interesting complication that I enjoyed to solve"*. The limitations were largely related to the materials and "making" technologies that were on their disposal. For instance, jute material was exclusively sourced from reusable shopping bags carrying UK store logos rather than typical gunny bags envisaged by the client. In reflection, the staff questioned whether the material, such as "authentic" printed bags, leather and fabrics from India, should have been imported whilst compromising the project's own carbon footprint. Finer Jute grades were short of supply. Having consulted with the University's Waste Management Centre, students considered cotton, as textile factory waste constitutes a major source of landfill. Students asked location specific questions, acutely aware of the consequences caused by a designer's decisions. For example, a student pointed out that "*growing cotton uses more water than sisal or jute*," thus creating a negative impact on "breadline" communities.

Due to the project's time constraints, there was less scope for the students to experiment with bio resins and cements. Instead, PVA and all-purpose adhesives were used at times. A shoemaker scrutinized some outcomes by querying the effectiveness of home-made cements without due tests. This prompted the Product Design students to critique the appropriateness of techniques in a way that their colleagues on the Footwear and Fashion courses would not necessarily consider. The questions that have been raised were: *"When would the thread-through-sole wear out? Is 'Velcro' tape acceptable? If not 'over-lock' sewing, how else can one could stop jute disintegrating into strands? Are pedal powered sewing machines in place?"* Or, *"how to strengthen eyelets without metal inserts?"* Product Designers are problem solvers and these questions seem to show empathy with the community they wish to serve.

Figure 2. Student presentation

4 STUDENT LEARNING

In the course of the project, research skills were introduced and material know-how disseminated. For this, the staff shared selected academic papers and proceedings from a co-current conference on natural fibres. Tasks were set for the students to follow-up on links provided by the original briefing document and also in a further brief that guides the prototyping part of the project. As for the contextual study, a few individuals excelled and one of the students could address "Ecodesign" and "Cradle to Cradle" approaches propagated by McDonough and Braungart [14].

Others commented on the practical or hands-on approach: *"… [we were] left to get on with work in our time and [we did] not [have] too many 'lecture' sessions"* and *"liked the physical aspect"*. One of the assignments was "Experimental Design" and thus had a practical focus, supporting kinesthetic learning or learning by doing a physical activity. However, one student commented that it was *"more difficult to see relevance to course … seemed more towards Fashion than Product Design … was a good challenge"*. Students negotiated conflicting agendas, especially the recyclability of waste materials such as car tyres. Some struggled with the making process, thus confessed that they *"could have done with more advice on how to make shoes"*. Others *"enjoyed working with materials I have not worked with before"*, for example, cutting steel belted tyres. By doing so, they learnt that in poorer countries tyres would be supplied with non-metal weaves. Perceived 'green' products were found to be wanting. Some jute shopping bags turned out to be lined with polymer film. Students became critical of this, questioning its bio-credentials and natural material properties.

5 BENEFITS FOR THE PROJECT STAKEHOLDERS

The relationship between the academic institution, the partner company and the Indian community is likely to produce more than short-term gains, and provides insights and networking opportunities to benefit the parties involved. Students *"liked how the project was managed and lots of information given and many opportunities to visit specialists"*.

Through the university's involvement with the client, the students have worked with natural fibres, addressing real needs and potentially helping people on the 'breadline'. Whilst engaged in programmes of stimulating social regeneration within communities through 'Responsible Design', it has to be asked whether or not it has sharpened the pupils' thinking and challenged them beyond conventional Design considerations; did the students make the link between 'Ecodesign' and social responsibility? In their feedback, our undergraduate students *"looked at beliefs, cultures, materials and the impact of all context"*, and when measuring the success of the project, a student stated that "*the idea of ecologically friendly products was good and very interesting. It was very constraining but important to think about*". They did like the project and found it "*interesting researching about India"*. When asking whether the project constrained their creative freedom some felt *"restricted to material"* or disliked the *"limits of the project"*, thus stating that *"The budget that we were given of one pound per pair and the fact that the project would be hand-made meant the materials life span and process we used were severely limited"*.

The project led to a strengthening of relationship across different departments of the university, although stakeholder's varied intentions were apparent: for example, Podiatrists wishes were to develop further footwear and orthopaedic apparatuses, using Design's prototyping expertise; Product Design staff felt that this live client project should enhance their students' creative and employability skills; The client gained Design concepts for new product development at nominal cost.

Within twelve weeks, multiple links were established, including the wider natural fibres community, funding and lobbying groups in respect of resource efficiency and sustainable design. Once the project outcomes are fully evaluated, this can lead to possible implementation of the concepts, further prototypes, manuals and fieldwork, ultimately benefitting the Indian community. The relative merits and suitability of all proposed footwear have yet to be evaluated, through the client and people native to the developing countries familiar with local ways of living. A shoemaker involved in the assessment thought that "*the consideration for cultural legacy by two of the students was very good – questioning the use of form in the underneath of the shoe when the children are probably used to walking bare foot, this I think is a very important consideration, especially where children's feet are concerned*". It seems that the students could not convince him by the use of jute for the upper in any of the presentations as he commented that "*… much more consideration was needed for comfort, strength, and durability, even if the shoes are only intended to last for months at a time before they are outgrown"*. Since then, the students followed up the suggestions regarding refinement of some of the

shoe construction. The same shoemaker presented further recommendations on a professional level: *"I would have maybe considered the possibility of using a veldtschoen construction especially with the availability of thread. And I think that any of the materials could have easily been stitched with the holes pre-punched. The veldtschoen method is potentially one of the most cost-effective ways of making in a cottage industry context"*. As exemplified above, Product Design students benefitted greatly by interacting with multiple professional practitioners and through working with real constraints. This collaboration resulted in deep learning that is not usually associated with a first year undergraduate project. For the first time, the students faced the issues of socially responsible Design and resourcefulness.

To conclude, there are many ways of working for the needs of underdeveloped and emergent countries as discussed by Papanek. [2] With the students, we trialled a meaningful engagement, arguably not long enough or deeply enough to fully understand local customs, needs and appropriate technologies, but furthered, by some measure, student learning through industry and research associations.

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