Design Futures: Connecting real life experiences and industrial processes in studio based projects.

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ABSTRACT

This paper discusses a studio-based lighting design project developed for second year undergraduate students in a four year design degree. The project is intended to develop student understanding of the technological and manufacturing requirements of the professional design process and has been repeated each year over a three year period during which time student responses have been gathered and changes made in response to student feedback. This paper highlights the benefits of real world experiences in the early stage of design education by extending the traditions of hypothetically and conceptually rich briefs, which impacts on the student's future design process.

The lighting project is based on a client brief/s that range from architectural lighting for commercial applications to lighting systems for emergency services. The project includes lighting workshops that explore the technical and ephemeral qualities of light and provides students with hands-on experience of industrial/manufacturing processes. It also extends understanding on the role of collaboration in obtaining a professional outcome, i.e. (producing working prototypes for exhibition). Students are required to source quotations from industry thus affording a tangible outcome and an understanding of the financial implications of their design outputs. Final working prototypes are presented in a public exhibition space, designed and co-ordinated by the student group.

The educational benefits of 'real world' experiences gained by the students and its impact on their design process is analysed. Student evaluations are discussed in response to the project brief, including their response to working with industry. In addition, how the results have enabled a refinement to the project over time.

By embedding opportunities for students to engage in industrial processes outside of the university they are more likely to assume a professional focus, share knowledge and engage in each other's experiences rather than focus on individual achievements and grades.

BACKGROUND TO THE STUDY

Whilst the design curriculum frequently gives students the opportunity to engage with industry/ies specific to their profession, few promote these experiences as early as the second year of the program. Anecdotal evidence suggests that many educators believe students have not mastered the language of design sufficiently to communicate ideas to non-design professionals or manufacturers. This paper identifies many benefits of learning derived from real world experiences and suggests that failure to integrate students into a wider design community, means that they are unable to contextualise their studies within a social and cultural framework.

RESEARCH FRAMEWORK

Design education is predominately viewed as vocational training for industry focusing on technical skills and knowledge. However, a purely vocational education fails to give the student a contextual framework and awareness of the world required of a designer. Historically this has lead to little consideration regarding the consequences of consumption and the unsustainability of products themselves. Therefore, ideally design curriculum founded on a liberal education exposes students to cultural and social influences enabling an understanding of the materiality of the world that can be reflected within their practice.

In a recent paper, Richard Buchanan, outlines the benefits of integrating design education into universities in the West and how this has enabled the programs to be more integrated with other disciplines, allowing for a more human centred outcome. He suggests design is best seen as an integrated system not an individual subject.

> Design is no longer a self-contained discipline that can exist in isolation. Designers must understand and work closely with colleagues in other disciplines for designers to understand – cognitive psychology, engineering, computer science, anthropology, drama, rhetoric, marketing, and so forth – but there is no dispute in the West that knowledge from other disciplines must now inform design thinking. (Buchanan 2004:35)

A designer needs to be a specialist in understanding different thoughts and problem solving strategies. An understanding of industry and manufacturing allows designers to integrate processes and expertise from other disciplines. By providing projects that are real and related to the broader community allows for a range of creative problems to be explored which encourages independent learning in students. Buchanan 2004 writes:

> Western educators have found that the creative energy of students is enhanced by encountering real problems and real difficulties among the people that we seek

> to serve. We call this 'creative problem solving,' and we attempt to encourage every effort that gives the student confidence in seeking and expressing a solution. (Buchanan 2004:36)

In design education the arena where most creative problems are identified and discussed is the studio project. The nature of the design studio is one of 'reflective-action' (Schön 1987) where skills and knowledge are acquired, discussed and applied to a design problem within a group setting. The structure of the project and scaffolding of skills and knowledge enables students to explore ideas through conceptual models, drawings, material investigations and personal studio experiences.

The design studio acts as a stage set where different interactions allow for a testing of assumptions and create new learning experiences. Students build their conceptual framework, which is tested by conversing with industry and suppliers who help the design student understand the industrial processes required to realise their design. By positioning the project within a real context the student evaluates the viability of their design. Changes and refinements are made to their designs based on existing industrial processes, money and time. Thus tacit knowledge becomes explicit knowledge that is then shared amongst the group. Sometimes this learning is informal and students realise the value of their learning experience much later.

THE STRUCTURE OF THE PROGRAM

The four-year Bachelor of Design program is situated in the School of Design Studies, Faculty of the College of Fine Arts at UNSW. It is unique in that it provides an interdisciplinary approach to design in keeping with the multidimensional nature of the creative demands of contemporary design. The first year experience needs to prepare students for a wide variety of studio selections. In second and third year students continue their design education across a range of studios; applied/object, ceramics, environments/spatial, graphics/media, jewellery and textiles.

Applied/Object Studio 2 is the second course in a sequence of four that are conducted over the 2nd and 3rd year of the degree. The studio project occurs in session two over a 14-week period and sets out to enable students to: engage in real life experiences with industry, work within a defined client brief and exhibit the outcomes in a public exhibition.

The learning outcomes that this project aimed to address Included:

- The ability to locate and review relevant designers' methodologies in response to the student's design process.
- Understanding of technical lighting specifications
- Development of a conceptual framework relative to the brief.
- Identify, research, analyse and resolve the design issues presented by the brief.
- Demonstrate professional studio skills in the preparation drawing specifications for industry quotations and evaluations.
- Refine professional presentation techniques, both verbally and visually and,
- Construction of a working prototype.

LIGHTING PROJECT METHODS OF THE STUDY

The lighting project extends the hypothetical project brief by placing it within specific contexts including commercial office spaces and emergency lighting systems (where the student identified their own client e.g. Fire brigade, personal safety device, police, ambulance etc). Students begin the project by investigating light from both primary and secondary sources. Their primary research includes studies in natural light, artificial light, types of lights, their function, materials and the emotional impacts of light on end-users, which are relevant to the particular client brief. This initial research is presented in studio allowing students to extrapolate particular qualities that are important and of interest to them, thus developing their own methodology and approach to the project.

After preliminary lighting studies students are introduced to more technical information on lamp holders, fixtures and light sources. Professional Lighting consultants have been invited to deliver this information to the students in the form of a lecture. In 2006 this was extended to include a one-day seminar/workshop where students had the opportunity to brainstorm collaboratively and explore different types of light sources and fixtures in a creative way.

Students were required to become familiar with industrial processes and technologies and asked to incorporate the use of laser, water jet or CNC router cutting in at least one element of the design. This enabled them to deepen their knowledge of computing by developing an STL file of the particular component. They also had to take their drawings to industry and obtain three quotations from the manufacturers, thus helping them to build industry relationships.

The final requirement of the project was to design and construct a public exhibition of the outcomes. This included: sourcing a space, designing an invitation, finding a guest speaker, developing a media release, managing the installation of the works and scheduling rosters for the exhibition (refer fig.6.).

CASE STUDIES

Case Study 1.
Project Brief 2005 Emergency Lighting System

The project brief required students to conduct a series of lighting investigations in emergency situations, e.g. bush fires, earthquakes, tsunamis, war, and other issues affecting displaced people. Students were able to select their own emergency scenario and were asked to conduct a series of interviews with a range of people (emergency service workers, aid workers, refugees) about their experiences, needs and preferences for lighting.

Fig. 1. Lucy Hall – The Adbusters Kit (2005)

Example of student experience

Lucy was very concerned about the current state of communication in the world and freedom of expression. In response to this situation she developed The Adbusters Kit consisting of a dynamo bike light that sits in place of your front reflector. The light is powered by wind spinning the propeller and recharging the battery. The other component was a snap-on torch that attaches to your aerosol can. The torch is powered by electro-magnetics through shaking and automatically turns on when snapped to the can. Lucy utilized rapid prototyping in a resin material, with a LED light source. All components of this prototype were operable. For a second year student project Lucy's response was ambitious, as she had limited 3d modeling skills and no experience of rapid prototyping. The relationship she developed with the engineer and rapid prototyping business was critical to the success of the project. It also demonstrates her ability to source out the relevant people and resources to realize her project. The work demonstrates innovation in consideration of sustainable resources such as wind power and questions the role of design by challenging the status quo.

> One of the biggest challenges I found was in finishing my design early enough to get it produced before the due date and not being able to amend it afterwards. Although the process was nerve-racking and stressful, it was extremely beneficial because it gave you a taste of what designing outside of University is like. The project allowed you to experience for yourself the issues and constraints that may arise within a design process outside of your tutor's recommendations through cooperating and working with people from the manufacturing industry. (Lucy Hall 2007)

Case Study 2.

The Project Brief 2006 XYZ Productions

The project brief required the students to design a new 'feature' architectural luminaire for XYZ (a television production company that had recently relocated to new premises). The design problem included both functional and social/cultural factors. XYZ was previously located in a warehouse which had dark interiors and low horizontal illumination levels on the working plane. The new office was more conventional and had higher illumination levels which led to many complaints. The employees requested that some of the character of their previous workplace be re-introduced. The students were required to design new architectural luminaires for either the reception area, foyer or employees breakout area. The luminaires needed to address the following: reflect the culture of the company by creating a sense of mission and purpose; make employees feel empowered, energized, and positive; and disperse the monotony of the standardized commercial environment.

Fig. 2. Brittany Bowller - Snake light (2006)
Location Breakout area

Example of student experiences

The snake light/table is a series of three light/table pieces that can be configured in several ways. Using multiple pieces the light/table is designed to 'snake' its way through the informal break out area of XYZ productions. Creating a fluid link through the space, the snake light/table encourages social interaction. The pieces can be pulled in or pushed away depending on an individual's need. White LED light penetrates from the frosted green verticals adding to the ambience of the space by creating an additional layer of light.

> I found the project to be an excellent first experience with industry, especially the pure fact of realising how important research, experimentation and making connections with people really is. The whole process seemed to be never ending with so many set backs and constant changes but at the same time I really enjoyed it, working towards a final outcome and exhibition. (Brittany Bowller 2006)

Fig. 3. Sachiko Kumazawa - Tomoshibi Lamp (2006)
Location Reception area

Sachiko's design intention was to reduce all elements so that the purity of the light could be appreciated. In the design of the Tomoshibi lamp, what is normally hidden has been revealed. The wiring represents communication, including one between the viewer and object. The lamp employs the least amount of material to prioritise light. Details remain modest, allowing light to radiate with full appreciation. Sachiko believes "without light, visual communication is impossible. Our eyes would remain closed. The smallest beam is enough to open our eyes." Sachiko's design was made from laser cut acrylic and seven Watt Megaman fluorescent lamps. On reflection of the studio Sachiko said that the studio had made her more aware of the numerous steps involved in creating a professional design solution and that often the small things that you think will take a small amount of time take longer.

> I have learned the how to detail information needed for industry to accurately reproduce my design. I think it is valuable to keep in touch with industry while they are constructing it - to ensure no mistakes are made or in case they forget about the job and time is wasted. (Sachiko Kumazawa 2006)

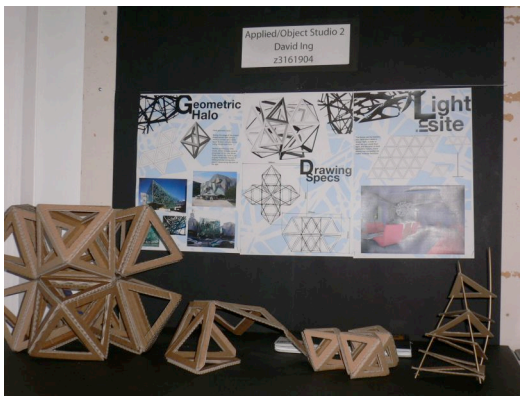

Fig. 4. David Ing - Geometric Halo – Development models

David's response to this project was to use architecture and geometry as a platform for exploring the issues outlined within the brief. The light utilises the practice of folded sheet metal and the individual structures are held together with magnets making the design flexible and open to many iterations of form. The design reveals the lamp and in this case enhances the simplicity of the lamp's form itself. Thus through an understanding of complexity, simplicity is achieved. David's greatest challenge was working with the limitations of the sheet metal and learning what processes he could engage from an industrial point of view. The design used turret punching to create edges, which were then folded by hand and spot-welded.

Fig. 5. David Ing - Geometric Halo (2006)
Location Breakout area

FINDINGS

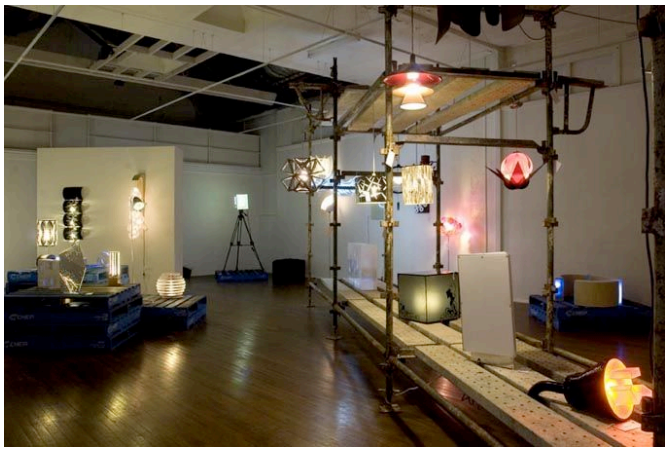

Fig. 6. WATT Exhibition 2006 Kudos Gallery, Sydney

Successful projects had the following characteristics. They demonstrated innovation within the design of the product, which included an appropriateness of lighting sources, technical/material investigations and context of use. The products demonstrated viability in regards to production processes, industry capabilities and marketability. Projects in 2005 and 2006 embraced the use of energy efficient lamps demonstrating an awareness of current challenges to energy efficiency in commercial and domestic environments.

Over the three years improvements have been made to the course including; changes to the way students engaged industry contacts, the utilization of commercial briefs with real clients, the engagement of a one-day professional

lighting seminar/workshop and the development of the student exhibition.

Working with industry and outsourcing of student projects has occurred in a number of ways. The first year of the project (2004), manufacturers were sourced on behalf of the students in order to save time and create economical outputs. However, by providing this assistance, students missed out on developing important communication skills. Therefore, in 2005 and 2006 students were encouraged to make appointments and discuss their designs with manufacturers on their own volition. This helped them to appreciate the importance of effective communication (both verbal and visual) as a tool to be honed throughout their career.

By working with the professional lighting consultant the project became more realistic for the students as the consultant was able to discuss current issues facing the profession and provide an actual client brief to work from. By providing projects that are real and related to the broader community, students can anchor their design ideas in a social framework and creatively explore problems which encourage independent learning.

Generally, students exhibit their work only as part of their final year. This paper identifies many benefits by exhibiting student works at an earlier stage in their education. Firstly it gives them an opportunity to show their work in a real life context that the studio classroom fails to achieve. Secondly it makes the students accountable for their design and lastly informs them of collaborative processes required to successfully stage an exhibition. In 2004 and 2005 the exhibitions were displayed at the Palace Hotel (a local and popular venue frequented by the students) and were more event based as the work was only exhibited for a 24-hour period. In 2006 students secured the use of the Kudos gallery (a University based gallery) for a week, which enabled the exhibition to be viewed by a wider audience and allow the students visibility and impact in the public arena.

From the UNSW Course And Teaching Evaluation And Improvement (CATEI) student subject evaluation forms in 2004 and 2006 and informal emails students consistently commented on the benefits and rewards of communicating with industry. The project was deemed relevant to their future career goals and encouraged independent learning. Students found the opportunity to develop a complete product rather than just a concept refreshing, and rewarding. Many commented that they felt much more confident in their design process and methodology.

Not all students experienced this situation with the same amount of enthusiasm. Unhelpful members of industry dismissed some students whilst others found quotations too expensive making the design unfeasible. The feedback given to me would indicate that a number of students found sourcing their own industry specialists as time consuming and felt they failed to achieve a good outcome. Other inhibitors to the students experience are class sizes, issues with studio space, and the costs involved in the project. The dilemmas faced by the students were shared during studio time and those that had positive feedback were able to share their contacts. This situation meant that students worked collaboratively sharing resources and discussing each-others designs in a constructive manner rather than a competitive one. Having the students share knowledge in this way is very valuable and demonstrates a closer scenario to real experiences.

DISCUSSIONS

The sense of independence in student learning and confidence is a great achievement for 2nd year design students. This project gives students an opportunity to test their knowledge and capabilities beyond the studio classroom and gives them a taste of the challenges and rewards of working as designers integrated into the broader community of the industry and professionals.

Whilst students found this project challenging and at times stressful their level of interest and engagement was maintained throughout the project. Making the students accountable by placing their work within a public environment means that the context for the project changes. Their focus alters from an internal individual interest to a consideration of their peers and how they will be evaluated/judged as a whole. This is in keeping with Buchanan's (2004:34) view that an integrated design education allows students "individual dignity whilst supporting collective social values, all within the pluralism of human experience."

CONCLUSIONS

In furthering this study, focus groups need to be conducted with students in later years to ascertain the on-going learning benefits of this project. The students learning could also be improved by the development of a central database where materials, list of suppliers, fabricators and documented student experiences could be made available to all students. This would enable a stronger focus on the design and development of the project. It would also encourage an improved response to collaborative learning where student's experiences are documented, allowing insight into industry experiences.

As stated earlier in this paper, the need for students to be exposed to a liberal education where ideas can be explored and evaluated are imperative to the development of their understanding of design and its broader impact. By embedding opportunities for students to engage with industry professionals, outside of the university, they become more aware of the issues facing the profession and gain an understanding of how a range of disciplines inform design thinking. (Buchanan 2004:35)

Design by nature is about collaboration and the success of a design is often not reliant on any one individual. Now more than ever, students need to understand how to collaborate with a range of industries and professionals. Our role as educators is to guide students to think creatively in developing unique ideas/solutions to design problems. This in turn empowers students, enabling them to make a difference to design, society and themselves.

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