

# RESEARCH THROUGH DESIGN AS A TEACHING TOOL

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## **ABSTRACT**

For an academic in an applied, professional area of study, such as Industrial Design or Engineering, the competing interests of teaching, administration and the demands of research are compounded by the need to maintain a realistic understanding of current practice.

A 'research through design' model of teaching by example, and involving students in ongoing, real world projects, is illustrated by the work of award winning designer Simon Ancher, the Academic Director of a degree in Environmental Design (Furniture). A study of his projects demonstrates how professional practice and teaching can intertwine to the advantage –and possible disadvantage - of both students and lecturers. Ancher's work is on occasion initiated by briefs set for students, demonstrating creative working practice to tight constraints in the studio and construction workshops in action. Ancher also undertakes commissions that involve pushing the boundaries of his understanding of materials and form, which he works on alongside the students, discussing with them ideas and development as he goes, and including them in experimental form making.

This paper analyses Ancher's practice as it impacts the students and the quality of teaching. Using specific examples of work, it tracks the development of the designs, the involvement of the students and the outcomes. This approach to maintaining relevance and currency in professional practice as a basis for teaching is discussed and its advantages, disadvantages and limitations outlined for academics in related fields.

*Keywords: Professional practice, research teaching nexus, batch production, creative thinking*

## 1 INTRODUCTION: MAINTAINING RELEVANCE AND CURRENCY IN PROFESSIONAL PRACTICE AS A BASIS FOR TEACHING PRACTICE AND RESERACH

Academics working in a discipline with associated professional applications, such as Industrial Design or Engineering, can maintain professional currency through external practice. Consultancy work or working in a commercially funded research unit, such as the Centre for Sustainable Architecture with Wood (CSAW) based in the Architecture and Design school at the University of Tasmania, provide academics with professional credibility, continuing understanding of the pressures of working to external deadlines and budgets, and a wealth of anecdotal evidence to colour teaching materials. However, neither of these practices directly supports student-centred learning or academic design research. The work of Simon Ancher, the Academic Director of a degree in Environmental Design (Furniture), is an example of an approach to professional practice and potentially academic 'research through design' that is integrated to a greater extent into teaching practice.

## 2 RESEARCH THROUGH DESIGN

There has been discussion on the role of traditional definitions of research (based on scientific research methods) and changing definitions of research within the design process for over twenty years. For example, Jonas [1] outlines a 'Design Research Movement' (DRM) that started in the 1980s to consider the particular relationship of research to the design discipline, and describes it as hybrid – 'looking for knowledge + aiming at real world improvements'. The movement addressed two related questions, the first internal to the discipline – how to make design a respected academic field, and the second on how design can contribute to human centred innovation for the benefit of society.

Discussion on the role and definitions of research within the design disciplines continue. In 2000 Delft University Faculty of Architecture held an international conference called 'Research by Design' asking the question, what does 'research by design' mean? According to a report by Hutton & Rattray [2] for the Architectural Research Quarterly, it set out 'to explore new ways of thinking in architectural research and its relation to design education and practice'. The report concluded that there was a consensus that research occurred in the form of systematic investigation was not challenged, but the idea that actual design output in itself, rather than when written about, could be considered research was debated. In addition, it was suggested that research practice in a scientific field tends to be de-contextualised, whereas design is by necessity contextualized. There was discussion on the view that dependent funding for commercial design work raised issues about impartiality and therefore the credibility of results. The article by Crabbe [3] in 2004, 'Contract Research in Design' addresses this issue, and discusses the political pressure on academic communities to 'reach a consensus about the nature and value of research in their chosen disciplines' in relation to the Research Assessment Exercise audits. He suggests a difference between 'applied' research and 'pure' research, with applied being goal-led, rather than exploratory. Ancher's work appears to span both. Fallman's [4] work on design research definition would seem more useful in this case.

In 2007, Fallman wrote a paper on 'Why research-oriented design isn't design-oriented research: on tensions between design and research in an implicit design discipline.' Fallman described a continuum with design on one end, fuelled by research-oriented design, concerned with real world outcomes, using judgment, intuition and for the benefit of clients, and research on the other end, fuelled by design-oriented research, concerned with knowledge, truth, analysis, transparency and judged by academic peers. He argued that trying to work in the centre of such a continuum would 'not be optimal' as clarity of purpose and parameters were vital. In his view, trying to answer real-world challenges and undertake good research that is recognized by academic peers creates too much conflict. His observations of practice are that 'academic researchers at times seem to be more interested in conducting research-oriented design than in design-oriented research'. Ancher's work blurs the line between 'research through design' and commercial practice and it is relevant here to look at its position in relation to definitions of research in respect to design. His work has a real world focus, and can therefore be plotted to the left of Fallman's continuum as research-oriented design. However, much of his exploration of form and technique is about trying to understand and explain the behaviour of materials and form that would place it to the right of the continuum. That he then chooses to apply that design-oriented research into real world applications should not undermine the academic credibility of the initial research, but demonstrates the difficulty faced in understanding the relationship between research and design. Whereas design-oriented research has the underlying intention of demonstrating new knowledge, to help us to better understand, to explain, research-oriented design has the underlying intention of creating a practical or physical outcome (this may be to produce a 'product service system' as described in Natural Capitalism [5]) that takes into account the market, sales, etc. Different peer groups and different parameters qualify the validity of the two approaches. Yet for the design discipline rationalizing these different approaches is part of building the discipline's academic research profile. Jonas asked the question, 'how can design establish its own genuine research paradigm (independent from the sciences, the humanities and the arts) that is appropriate for dealing with purposeful change in ill-defined (therefore called complex) real-world situations? Jonas breaks it down differently, he states that 'the scientific paradigm has to be embedded into the design paradigm – research is guided through design process logic, and design is supported / driven by phases of scientific research and inquiry'.

Ancher's research work is focused on developing new approaches to batch and mass production, and also supporting the individual designer-maker by innovative thinking, techniques and technology. In order to maintain a reputation in the design community and to maintain currency in understanding the issues involved in working in design whilst working in academia, Ancher enters design competitions and accepts commissions that interest him. If this work can be defined as 'research through design' that supports the design research teaching nexus it can be justified as a vital part of his academic role. If not, it can be argued that by doing so Ancher is focusing on his own work rather than that of the students, and this criticism has been levelled at him. Not only is Ancher committed to time spent on such projects, he is also committed to real world deadlines that may conflict with academic deadlines.

It is possible to consider the positives and negatives of the issues through tracking particular examples of project.

## 2.1 Craftsmanship and the use of digital manufacturing

The changing role of the digital manufacturing within batch production is a topical research subject in furniture manufacturing, as illustrated by publications such as Furniture Makers Exploring Digital Technologies [6] and The New Furniture: how modern technology is changing the furniture and cabinet industry [7]. An example of Ancher's 'research through design' in this area is his recent development of a series exploring curved form making using digital technology. In this work, Ancher 'brick' laminated straight solid timber lengths, applying the desired curved, sculpted form through the use of digital technology, production-method CNC routing rather than hand shaping.



Figure 1. Producing curved sculptured forms using 'brick' lamination (c.Ancher 2009)

Ancher utilised the curved form in a dining table leg structure to test it. He found that under load twisting and torsion movement was not absorbed by the form, dramatically reducing its structural integrity. The curved form, although laminated, which conventionally adds to the strength of the material, was weakened by shaping and was vulnerable at the exposed brick laminated joint. Due to the accuracy and efficiency in form generation opened up by the use of digital technology to create moulds and formers, Ancher found he could rapidly develop new manufacturing strategies and moulds that enabled a single flowing lamination, eliminating the problem and improving the design outcome.



Figures 2 & 3. Larger forms with improved load bearing capacity (c.Ancher 2009)

The new forms then allowed for the development of a new type of lamination that addressed the added stresses at the ends of the forms created by using one piece rather than two shorter pieced elements. This development allowed Ancher to create much larger forms with an improved load bearing capacity. This research was then applied to a large (3.8m x 2.6m) glass-leafed boardroom table commission for the New Menzies Research Institute building in Hobart.

### 2.1.1 Outcomes

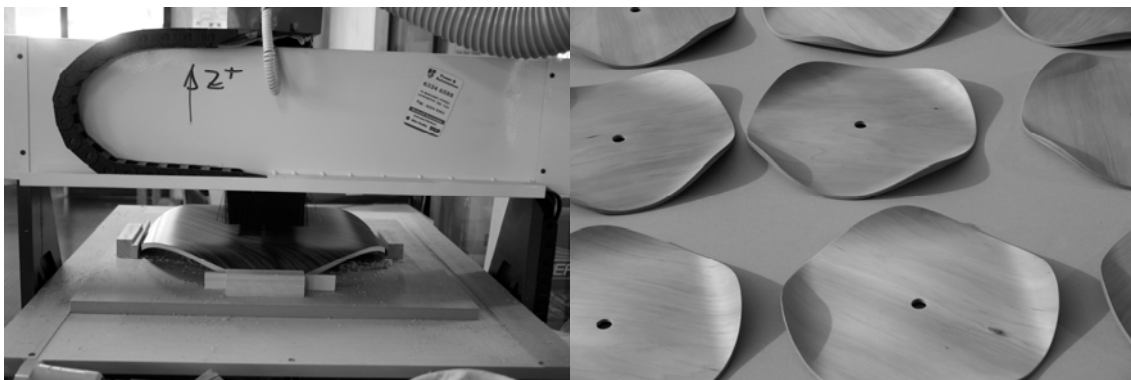
Working through this research in the studio allowed students to see how research could be explored without a specific application, and then how design development is supported by directed research. It shows how research can lead to design ideas and also the critical use of prototyping. Ancher also considers it models a working practice that supports an attitude of 'I am working this out, there are going to be problems'. Recognition of design as a process and an expectation of development and change are part of the transparent practice Ancher models through repeated testing and development. First year students working with Ancher on this project then demonstrated a willingness to experiment in form making in their own work that not been evident in previous years. Projects included a large-scale experimental lamination and work in multiple materials based on folded paper.

An initial commission to create a marble topped dining table had led to Ancher's exploration of creating long forms using digital manufacturing techniques, which took him beyond the brief into what could be argued as defined by Crabbe as 'pure' research. The exploration work was generated by the original commission, which supports the assertion that it is self-perpetuating 'if research is used to propel a new design (research-oriented design) that particular design simultaneously propels further research (design-oriented research) and so on. Hence design and research seem to fuel each other ad infinitum' [4]. The results of that exploration were then used to create a new design, during which further 'applied' or goal-led research was undertaken to fulfil particular requirements.

## 2.2 Design for production with restrictive parameters

As we know as academics, setting a brief with restrictive parameters can lead to creative solutions. The students were asked to design a production piece that incorporated an already manufactured item. However, the range of items to incorporate, chosen by students, were limited and in many cases restrictively expensive for the exercise (light fittings for example). To show the potential of the brief to inspire design directions, Ancher stated that he would demonstrate the design process and restrict himself to items within view in the workshop. He selected a milk crate that was being used by a student as storage.

Ancher discussed with the students possible use of the milk crate. The two most straightforward were as storage and as a seat. Ancher said he had seen workmen sitting on upturned milk crates in an alley in Melbourne and had wondered if they had been brought specially by the workmen to sit on, or had just happened to be there already. The students tried out the milk crate to sit on and found it was too low to be comfortable; it had a flat surface that was also uncomfortable, and in turning the milk crate upside down to sit on, any contents would have to be removed. With initially workmen in mind as a target market, Ancher set out to create a low-cost addition to the milk crate that would address the issues found by the students. After a recent visit to a veneer mill, the students had been given a pack of rotary peeled, low quality veneer. Working alongside the students, and in discussion with them at each stage, Ancher built a shaped, plywood mould and curve laminated sheets of veneer on it. In order to clean the edges up, he drilled a hole in the centre so that he could use the laminating mould on the spindle moulder with greater efficiency.



*Figures 4 & 5. Milk crate chair under construction (c.Ancher 2009)*

The curve of the initial prototype was adjusted through testing, and the hole made slightly larger on the CNC router as it allowed for water run-off and also made the seat easier to lift off the milk crate. At this stage Ancher was still thinking of the product market as workmen and was keeping costs to a minimum. However, when he and the students considered the next step of taking a product such as this to market, they had concerns over the extent of the profit margin. Ancher decided to take the product in its raw state to Design Made Trade, which is a trade exhibition for product designers to launch their products from in Melbourne, Australia. This involved the cost of renting a space, travelling to Melbourne and staying there for the four days of the show.

On returning from Melbourne, Ancher discussed the feedback on the product with his students. Potential buyers had expressed sufficient interest in the idea for him to validate his decision to invest more time and money in developing the product further. It had also suggested to him that there was potential to raise the price bracket he was aiming for and increase the profit margin. The target market shifted from workers looking for casual, low cost seating, to design conscious, inner city mid-twenties to mid-thirties buyers looking for innovative storage that doubled as seating for casual living and nursery situations.



*Figures 6 & 7. Refinished for revised target market (c.Ancher 2009)*

### **2.2.1 Outcomes**

The work involved in developing a relatively simple idea demonstrated to the students that design is a process, not solely an inspiration. A willingness to accept – even embrace - changes to an initial idea as part of design practice challenges the notion that first year students frequently have that the initial idea is sacrosanct. Thinking of design as an iterative process also allows for changes due to manufacturing constraints and material availability.

Ancher worked on developing the seating for the new market by exploring different finishes, refining the curve and trying different sized holes in the centre to help the aesthetic read of the curve. The final product consisted of ten layers of 1.2mm veneer sandwiched between 2 laminex sheets, neatly trimmed and shaped on the spindle moulder, with a 25mm hole in the centre. Ancher then returned to design Made Trade with the product rebranded as ‘SCW’ and marketed for its new target market. This time the product received considerable attention. It was featured in InDesign magazine, Design Boom, Design Quarterly and Green Magazine. It was then also selected for a ten year anniversary show of Workshopped, a national show based in Sydney, one of only twenty pieces for the last twenty years, and chosen to be sold on-line through Workshopped’s retail web site.

## **3 CONCLUSION**

For design lecturers working in academia over long periods, the gap between real world projects and hypothetical projects can result in unrealistic, over-ambitious briefs (e.g. Walking buildings received a teaching award but the lecturers concerned felt the students could not tackle it effectively). It is easy to disengage from the reality of initial and directed research and of taking a product beyond initial development stage. Fostering an honesty in setting design briefs through the participation of the lecturer in tackling the briefs themselves alongside the students could have negative effects, such as feelings of intimidation (of either the students or the lecturer), bias in marking (based on a view that their personal design development was the best way to answer the brief), resentment (because the lecturer is concentrating on their own work rather than being available to facilitate the work of the students) and imitation (the student feels compelled to copy the lecturers approach). On the positive

side, modelling design research and design development this way can foster a teamwork approach, persistence and confidence in the students in their own abilities (having seen the lecturer genuinely struggle through a problem), a willingness to explore initial and directed research – including that begun by others, and an overall work ethic (lecturers are seen visibly to be working in between contact time, rather than being hidden away in their offices).

Fields of study that have an applied aspect, such as Industrial Design and Engineering, will always contend with the hybrid challenges described by the Design Research Movement, of fostering credibility within an academic system that is increasingly funded through research output (initially based on traditional forms of scientific research method) and also a constantly evolving professional practice. The form of that recognised research output is also evolving with Arts practice having led the acceptance of peer reviewed exhibition work as itself research, rather than as formerly only peer reviewed articles written about the exhibitions considered research, and this then affects the consideration of practice such as Ancher's. By involving the students in both design-oriented research and research-oriented design, Ancher is creating an example of a design research teaching nexus. Peer review of his work – professionally through successful practice and competitive awards and academically through peer reviewed exhibitions – substantiates the value of the form of 'research through design' undertaken and is necessary to ensure that the students are involved in ongoing real world projects that could benefit their academic development. This validation is recommended for other lecturers when establishing similar practice, as is an in-depth understanding of the specific role and definition of any design research, including, for example, its place on Fallman's continuum. To contribute to the credibility of design as a respected academic field, academics engaging in real world projects that claim a research aspect and are to be used as a teaching tool, will need to be able to dissect the research and pedagogic values they offer with equal credibility.

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