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# Rethinking pedagogy for iterative design process learning and teaching

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**Abstract:** *Product Design as an academic discipline is a relative newcomer to higher education. As a result it has had to adapt to the teaching practices and organisation already in place in Universities. However, with the viability of the current business model of higher education under threat from economic pressures, the dominance of established practice could conceivably be challenged, suggesting the time is right for a review of Product Design education as it operates within academia. Product Design educators need to focus on developing an innovative, practical approach to the organisation of learning based on sound design practice-based principles and provide leadership in pedagogy rather than adapting to the pedagogy of others. Design is a unique discipline that can impact on other disciplines as it is necessarily predicated on ideas of leadership and innovation. The role of Product Design in higher education should not deviate from that. Product Design has a real world heritage that is characterised by realistic, considered, innovative thinking. This paper is a reflective opinion piece, suggesting how that thinking could be applied to redress an imbalance in teaching design process to facilitate a more real world experience for the benefit of students and confidence in the discipline as a whole.*

**Keywords:** *Learning spaces, workshop, computer-aided design, integration, pedagogy.*

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## Introduction

Over the last twenty-five years, Product Design education has graduated from professional training into a recognised academic subject in higher education, but there has been a cost. Design has had to be manipulated to fit with conventions of higher education teaching across traditional disciplines. Project work has been increasingly divided down to fit into a modularised method of teaching whilst design research has skewed from practice-based research towards the study of the ontology of design.

Design, as an applied subject, has its own particular approaches and ideas that underpin professional practice as well as design research, and inform teaching. These approaches and ideas are not common with other disciplines, differentiating it from more established areas of study and research in Universities. However, the pressures to conform to the structure and teaching organisation of these established academic disciplines, and of trying so hard to be taken seriously as a research discipline, have altered the focus and pedagogy of Product Design teaching to the point where it is in danger of losing its identity, as highlighted by Crisp (Crisp: 2011) and argued by Loy (Loy: 2012).

Until recently, this trend looked set to continue with discipline academics advocating the distancing of design from its professional roots to gain acceptance in the more elite higher education establishments, such as the G8 in Australia, but then economic factors intervened. The downturn in the economy in the Western world has re-ignited the need for innovative, effective design professionals to contribute to a manufacturing-based economic drive to move Europe and America out of the recession (for example, Obama investing in additive manufacturing in Ohio as widely reported, for example in Science Magazine in 2012 and the UK government identifying growth in the manufacturing sector as vital for recovery, as discussed in BDO, UK in 2012). Combined with this, has been the uncapping of places in University systems and increased competition to attract students now paying substantially for their education in countries such as the UK and Australia. As a result, graduate destinations are gaining in importance again, in comparison to recent years, and the ability of graduates to work effectively in manufacturing, particularly with new technologies and global markets, is having an impact on the direction of discipline thinking, both in research and teaching.

Overall, it is a good time for a rethink for the discipline. Time to pause in the relentless pursuit of acceptance and conformity in the University education system, and step back from the imposed methods and philosophies of teaching practice that Product Design lecturers have found themselves subject to. Time to re-evaluate the knowledge base of the discipline, the learning priorities for future designers and how these can be best achieved, irrespective of how teaching is organised at the moment in other disciplines. With a strong reiteration of the values and principles of Product Design as a base, approaches to design teaching can be redefined to support the subject, not merely to conform to established practices in higher education teaching, but to lead the way to new practices in learning and teaching in higher education instead of following those that are already in place.

## **Redesigning Design teaching**

Product Design (defined here as the study of problem solving with a focus on production) is a unique discipline. Its challenge is to combine two opposites – art and engineering – and to work with a constantly shifting viewpoint. Successful designers move between creativity and process effortlessly, without allowing one or the other to dominate, throughout every stage of a project. It is recognised in Product Design teaching research that immersive, experiential learning workshops allow the students to emulate this approach and develop strategies for left brain, right brain shifts in thinking whilst mapping, planning and applying problem solving techniques to complex situations. However, this approach does not lend itself to the modular organisation of learning in current, conventional University teaching. Units or courses in a structured undergraduate program taught week-by-week and organised into teaching sessions, subdivided into lectures and tutorials, are the dominant paradigm. Immersive workshops rarely fit. In trying to create a conventional academic discipline out of Product Design, there is a danger of it losing the rigour and integrity of its characteristic project based, client focussed approach.

What if designers were given the rethinking of the teaching of Product Design as a design task? What would be the outcome of initial research? How would the return brief differ for the basic redesign of Product Design University teaching? What would the design intent look like?

The key to effective Product Design teaching is to provide learning opportunities that encourage an iterative design process that moves the student between the objective and subjective, the practical and the theoretical, the imaginative and the critical throughout their work and does not create artificial divides or impose a linear process.

The divisions that generally exist in Product Design education now, are in part due to the convention of allocating specialist-teaching areas along units, rather than across them, with single lecturers responsible for teaching an entire, isolated course within a semester and rarely across courses. By dividing teaching in this way, discipline specialists are inevitably inclined to detach their own teaching focus from the holistic nature of design that is at its core. This can create an imbalance in the design learning experience and allows for specialist areas to develop in ways that are divorced from an applied design thinking approach.

In the drive to understand and pin down design process, both for teaching and for research purposes, there is a danger that the holistic, iterative nature of design practice is reduced to a didactic systematic methodology approach. In addition, by dividing out skills, theory and design studio there is a fragmentation of design process that is difficult for the student to recover from.

Even within a design project based module there is a problem with instilling iterative practice if it is a single course stream within a program as it has little opportunity to build the depth of thinking and iterative research and development needed to give the project experience credibility. Tornado thinking, where a repeated cycle of primary and secondary research, creative thinking and critical evaluation informs design development, moving it towards a conclusion, is based on all aspects of design practice being applied throughout the project, not consecutively but concurrently. To promote this thinking over an entire program, there needs to be a greater awareness of the role of year co-ordinators, stream co-ordinators (who track the revisiting, progression and accumulation of ideas and skills vertically through the

degree program), the rethinking of the allocation for specialists to ensure that their expertise is spread across units, rather than delivered in isolation along units of work (a move that also supports research specialisation), the reinforcement of assessment practices that embrace failure as a teaching tool for experimentation (Kelley, Littman, Peter. 2001) and the changing of physical spaces to support positive working practices.

If the basis of inculcating a rigorous, iterative practice is to ensure a holistic approach to project work, then the combining of theory and practice seamlessly to inform thinking is essential in facilitating that combining of opposites – art and engineering – and a constantly shifting viewpoint. To promote the successful movement of designers between creative thinking and practical and research based processes repeatedly throughout the entire project, rather than in lineal stages, means a breaking down of compartmentalised teaching, and a refocus on genuine iterative cycling through 2D and 3D, practical experimentation, lateral thinking and research based informed reasoning all the way through.

Proposed design intent as the basis for the redesign of the University teaching of Product Design:

**What** – Create situations that enable – ensure - integrated teaching, re-imagine course organisation to promote an iterative, creative, practical, and theoretically informed design process. Create a culture of making based on experimentation throughout project work, break down barriers to integrated learning through making, break down learning silos such as CAD teaching, integrating it into design studio rather than teaching it as a separate set of units.

**Why** – The basis for Product Design education is to create a constantly shifting viewpoint, an ability to think creatively throughout a project (not just at the beginning), to map and use whatever tools are the best to move a project forward and test its validity (at every stage), to research practically in 3D and using secondary research to inform design development throughout the full distance of the design project – at every stage in every possible way.

**How** – Reorganise teaching by specialists across courses rather than along them. Facilitate team teaching and the provision of lecturing staff in the role of consultative expert for the students at every stage of a design project, irrespective of a unit structure. Rethink the curriculum to work across specialist areas, not along them. Rethink learning spaces to encourage working across specialist areas for genuine iterative design development – no dedicated computer labs, for example, but rather combined spaces with CAD and advanced technology alongside studio space with easy access to physical workshops that are set up as experimental stations. Break up lecture / tutorial structures where they exist in favour of student centred learning and use blended learning to encourage proactive learners. Create assessment that rewards integrated practices.