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Collaborative and multidisciplinary designing: contemporary challenges for design studio teaching

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ABSTRACT

Industrial Design education in Australia tends to promote a comprehensive view of the role of designers; commercially aware form-givers who can deal with the technical, material and production issues related to the implementation of their designs. The Design Studio experience is generally regarded as the central educational device which is used to expose students to the principles, practices and possibilities of designing. It is also seen as a venue for acquiring understandings of various concepts and disciplines related to the field, and learning to integrate these within designs. Collaborative and multidisciplinary activities are often used within the design studio to connect students with these contributing disciplines. While much has been written on the nature of the studio as an educational setting, this paper identifies some of the challenges in contemporary design studio teaching using examples from an Australian university context. One central aspect of these challenges is the manifold nature of learning outcomes intended to be gained through the studio experience. Each student is expected to develop a capacity to define and resolve design problems; to understand and internalise the discipline's ways of operating and to appreciate and identify with (industrial) design as a discipline in its own right. In addition, each student has to develop some understanding of particular knowledge areas related to the design of products and systems; the social, cultural, technological, commercial and environmental where-with-all that is required in designing. Further, the studio typically seeks to foster the students' ability to collaborate with other designers and other specialist disciplines in the corporate activity of designing, developing and distributing new products. The management of these different types of learning outcome is being affected by issues such as the changing technology used in design work, the bourgeoning complexity of products and systems (and services) being designed and the increasing sophistication of all the disciplines involved in product development and their own methods of inquiry and knowledge-building. This paper presents the view that contemporary industrial design is now a field of such breadth and complexity that the traditional undergraduate studio teaching model is unable to provide a comprehensive educational response.

INTRODUCTION

Design is as a useful way of dealing with particular classes of complicated problems and it has been recognised that the thinking and processes that constitute designing are applicable to a widening range of challenges that arise in contemporary society. Buchanan (2005) categorises the scope of design practice under "four orders". He describes these as: a first order of design which focuses on problems of communication; a second order of design which focuses on the problem of constructing artifacts; a third order which is concerned with the design of activities services and processes; and the fourth order of design which deals with systems, environments and organizations. He argues that the third and fourth orders are more recent additions to the gamut of design's areas of application.

This framework provides a useful starting point for the ideas presented in this paper. Industrial design practice became established during the 20th Century as one of the fields concerned with Buchanan's second order of design. Its primary focus has been the design of physical, tangible products and its contribution might be described as complementing engineering design (and other contributing disciplines) to make these physical products accessible, desirable and usable for users/consumers. The scope of the industrial designer's concern spans engineering issues and product functional capability as well as emotive aspects of product 'appeal' (aesthetics) and perceived quality and value. Industrial Design, like other design disciplines, applies a creative, solution-focused approach to the structuring and resolution of the multi-faceted problems within its domain. And, like other design disciplines, Industrial Design education tends to follow established models based around the design studio as the central learning/teaching context for developing appropriate skills and knowledge. Green and Bonollo (2003) describe the historical development of the studio-based teaching of industrial design and they identify changes in the nature and complexity of many industrial design problems. These changes are caused mainly by the growing recognition that the outputs of industrial design tend not to be discreet artifacts, but rather sub-components of increasingly complex material and social systems.

It does appear that, in the 21st Century, it is difficult to characterise industrial design as a strictly 'Second order' activity. Much of contemporary industrial design practice carries with it an involvement with 'third' and 'fourth order' problems. A question for educators is how our educational settings might deal with the implications of this. The

understanding of design activity, the qualities that characterize the expert designer and the educational activities that support development of these qualities are the subject of various, developing lines of scholarly inquiry (Dorst 2005). It seems however that educational models in industrial design are still, in general, following the established conventions of studio-based teaching and seeking to adapt these to this expanded design agenda. Industrial design has always involved an engagement with various disciplines that contribute to the development and distribution of products. And engaging students in cross-disciplinary collaborations has long been seen as a way of allowing them to establish a base-line, generalist knowledge of other disciplines and allowing them to learn about their role in relation to each discipline's specialists. Many educational challenges in today's design climate stem from the expanding number of disciplines which are connected to industrial design activity, their own expanded complexity and the increasing sophistication of their own methods and processes. This paper gives some examples of responses to these challenges based on experiences in the Bachelor of Industrial Design Program at the University of NSW (UNSW). These will relate primarily to the Australian context but the implications will also apply elsewhere.

I. A 'COMPREHENSIVE' DESIGN EDUCATION

The Bachelor of Industrial Design at UNSW was established in 1990. Rather than being based on an Art School background, the 4 year program was developed within a faculty of architecture with strong connections to faculties of science, engineering and commerce. The program involved a studio-based core with complementary studies in various specific disciplines and contributing knowledge areas. This is a well-established model for industrial design education where the studio supports the learning of design process skills and knowledge as well as the integration and application of understanding of various contributing disciplines such as materials science, engineering, human factors and marketing.

The aim was to provide students with a comprehensive experience of design and its role with regard to the commercial objectives of organizations, the needs of their customers and the technology of manufacturing and distributing products. The program also aimed to equip students with a fairly high level of baseline knowledge across the various disciplines covered. Successful graduates from this program had particular areas of strength but they would be required to also show an 'all-round' capability which allowed them to contribute to the full breadth of design issues. This concern for all-round capability rather than focusing solely on the 'front-end *style wizard*' has tended to be a characteristic of Industrial design education in Australia. It appears to be linked to the relatively small scale of local manufacturing enterprises and design practices and the resultant need for versatility among team members. I suspect it is also linked to a broader pragmatic leaning within Australian culture.

In designing, there is a division between skills and knowledge that are accepted as part of the 'design core' and skills and knowledge that can be seen as belonging to other disciplines. The actual point of division can be quite difficult to define. For example, in order to propose a design that can be implemented, a designer needs to know 'enough' about a particular material and manufacturing process. The answer to the question: How much is enough? depends on a whole range of issues to do with the context of the work such as the stage of the design process and the expectations and capabilities of others involved in the project. This example considers one aspect of designing. Along each of the many and varied dimensions of a design problem which involve other disciplines, this division exists; a point of departure from the designer's knowledge-in-practice and the specialist domain. These points may be explicitly stated, tacitly known or actively negotiated in the realization of a design. Conventional educational settings tend to isolate the individual 'learner'. They seek to help to strengthen the individual's 'core' of design knowledge and skills and then 'extend' her/him along the various disciplinary dimensions.

The UNSW program was originally structured to give a reasonably complete representation of the types of disciplines which contribute 'second order design problems'. It linked to these disciplines very effectively through formal course delivery across science, engineering and commerce and the integrating activities of the studio. You could say it sought to 'stretch' all students quite extensively along well-defined disciplinary dimensions. The studio class was (and still is) pivotal in allowing students to explore, develop and understand the links between their own knowledge and the knowledge, processes and practices of other disciplines. Collaborative projects with marketing, engineering and materials students not only served to model future professional activity, but they help students to 'work out' the scope of their discipline and their own strengths and weaknesses within that scope. Industry-linked studio projects have also had an important role in this by exposing students to the contributing disciplines within participating organizations. This function of the studio is common to most industrial design programs but it is particularly important in the integrated model that was established at UNSW.

II. INDUSTRIAL DESIGN'S EXPANDED AGENDA

In the 17 years since its introduction, there have been a number of periodic revisions of the UNSW Industrial Design program; each responding to a range of forces for change. Among the most challenging forces has been the expansion and change across the range of knowledge areas with which the design discipline interacts. Within the studio classes there has been a parallel, more organic evolution. While overall changes in the Studio courses have been linked to the formal program revisions, ongoing review and development processes have continually re-shaped each semester's offerings. As importantly, the studio has been influenced through the recruitment of staff, their developing research interests and their own cross-disciplinary networks. One result of these changes is that new dimensions have been

added to the integrated course model and previously 'minor' dimensions, have been given greater emphasis within the program. Various studio teachers have embraced different emerging themes in contemporary industrial design and have woven these into their studio courses, often using action research models to document evaluate their developments. Some examples of these are briefly described below:

A. The green imperative

The relationships between industrial design and the environmental impact of mass consumption have gained greater importance in design education in the latter part of the 20th Century. Developments in this area have been reflected in the changes to the UNSW program. Earlier Studio work might have focused on 'eco' materials and life cycle analysis issues whereas more recent work is concerned with product-service systems and related resource implications (Ramirez, Andrews and Tonkinwise 2004). This kind of development opens up a new range of methodological and educational dimensions.

B. New manufacturing

In the same vein, changes in the technology and management of manufacturing have had to be incorporated into the program. Green and Bonollo (ibid) map out some of these developments; from design-for-manufacture and design for disassembly through to mass customization and lean and agile manufacturing. They note that these "compete for consideration within the design studio"

C. User-system interaction

This is another example of a changing dimension in the industrial design paradigm. It may be helpful to expand on the developments in this area and related changes in the UNSW program. Since the establishment of the program, Human Factors/Ergonomics has been taught in discrete specialist courses as well as within the studio classes. The role of these was to set out the principles of physical and cognitive interaction with products and systems and the application of these within design activity. By the early 90s product usability was seen as a key issue. The developing range of tools and processes related to user-centred-design were being incorporated into the courses and studio projects. Towards the end of the 90s, and over the past few years, concern for a more formal consideration of affective responses to designs has permeated the human factors and design fields. Methods derived from the social sciences have been employed in design research and practice and these too have been reflected in the teaching of human factors/ergonomics and in the design studio classes. The impact of these changes on studio projects is profound. In the case of 'affective human factors', project briefings have been founded on a cultural discovery process rather than a client-driven requirement for a new product. Contributing disciplines and collaborators have included psychologists, social researchers and media professionals (Talbot and Pandolfo 2003; Bernabei and Talbot 2002). These projects have been valuable educational experiences and have yielded results that have been highly regarded both in Australia and internationally. But one has to consider how the expanded skill and knowledge base involved affects students' experiences of other aspects of the program and the overall outcomes generated.

III. The 'integrated' model and some alternatives

As the demands on, and impact of, industrial design activity have shifted from focus on the discrete product to include the level of socio-technical system it has become increasingly difficult to present a cohesive, integrated model of industrial design in which the design student can gain adequate command of all the various dimensions involved. In the Australian context there appears to remain an expectation that a student can emerge from a four year undergraduate program with an 'all-round' capability that prepares them to develop as commercially aware form-givers who can deal with the technical, material and production issues related to the implementation of their designs. Relatively few industrial design graduates in Australia pursue postgraduate study within design schools; they tend to broaden out into other areas. Given a four-year window of undergraduate education, is it feasible to present an integrated experience of studio learning and related courses that adequately represents contemporary industrial design and allows the development of adequate competence across all the discipline dimensions represented? My concern is that this is only possible when working within a fairly narrow and outmoded view of what industrial design is. I would argue that the UNSW program has departed from an integrated model to one where it is less concerned with comprehensive exposure of student to *all* the major disciplines that contribute to design. It as taken on a hybrid form where, through its discipline-based courses and studio projects, it still seeks to establish the 'all-rounder' capability in relation to materials, production and commercial objectives. But the studio carries the dual role of integrating these capabilities into design projects as well as exposing students to some of the expanding number of emerging alternative views of design and designing. This makes the range of cross-disciplinary involvements across the program difficult to manage from semester to semester and difficult to link to associated coursework outside the studio. A current danger that we face is that some students may develop a fragmented view of design and have difficulty in articulating and pursuing a sound approach to defining and resolving problems. In response to this, Green and Bonnollo (2003) propose adoption of a more systematic and structured methods framework to anchor and inform student progression through studio projects. Aspects of this have been introduced in the UNSW program but a wide range of methods is required in order to support the range themes and processes explored through the studio courses. Teaching staff have also not established a uniform overall approach and common descriptors required to reinforce this framework across the program.

Another model is to allow elective pathways within the design program so that students can focus on an area of specialization giving them a more cohesive experience of

fewer particular design fields and associated disciplines. This does 'cut against' the Australian tendency to develop the 'all-rounder'.

Feijs and Kyffin (2003) outline another model which has been established at Eindhoven University of Technology. Citing changes in the industrial design paradigm similar to those noted in this paper, they outline a context-based program centred around social themes or *units* of: home, entertainment, communication, health, mobility and work. This involves a complete re-aligning of curricula around the themes. This is attractive in the way it focuses the context of learning activities. This kind of program, compared to Australian design schools, appears to require a large 'critical mass' of students, staff and resources to provide a suitably diverse range of learning modules. It should also be noted that the TU Eindhoven program is aligned to the theme of 'ambient intelligence/ intelligent products' and so is presenting industrial design with a particular 'leaning' (albeit a far-reaching one).

IV. Conclusions

The Bachelor of Industrial Design at UNSW has changed from a comprehensive, integrated program to a hybrid blend of 'traditional core content' and new knowledge areas and practices emerging within the field. This change has been brought about through periodic overall revision as well as incremental development of studio courses. It can be argued that the program in its current form provides students with a good 'all-round' foundation *and* fosters engagement with new changes in industrial design's scope of application. However, I would suggest that this trajectory of program development has its limits as the capacity of students and staff to negotiate the widening range of relevant knowledge continues to be stretched. New educational models need to be considered. If UNSW is a representative case, it seems that industrial design schools in the Australian context need to review their focus on educating the 'all-rounder'. Perhaps the shortest path to a new model for UNSW is to reconfigure the hybrid model. This might be done by revising the make-up of the 'traditional core content' so that it reflects the profile of the 'design specialist' rather than the 'product design/development generalist' This involves the challenge of articulating a more essential set of foundation characteristics of the discipline that will still allow students to create a platform from which they can continue to engage effectively with the rapid changes surrounding new product and system development. This is not a trivial task. As design is learned through its application- its essence cannot be distilled from its context- it is difficult to envisage the facilitation of foundation learning that will empower students to grapple with an increasing diversity of complex design tasks within a 4 year undergraduate program. Perhaps it is time to consider alternative models which accept a greater degree of fragmentation/specialization within the field of industrial design. Many programs allow students to pursue specialist pathways through which they explore the links between their design learning and a particular specialized field. This is not typical of Australian industrial design programs. Context/Competency based learning such as the TU Eindhoven model represent a huge departure from the current UNSW model. Such an approach if used here might need to be aligned with a particular, and perhaps narrower, range of contexts due to the population base and scale of Australian industry. More likely, such a program would be networked internationally. This might be a workable option.

To consider an even larger shift, perhaps the time is coming when design learning can be 'redistributed' across the various contributing disciplines which influence new product and system development. This might involve a kind of dismantling of industrial design as a separate discipline in lieu of development of design as a strong capability within the various related fields. As design educators we need to explore the possible future models with some urgency to ensure that our students will to be able to equip themselves for the rapid changes ahead.

References

Bernabei, R and Talbot, J., 2002, Terra Nova: reflections of student design work as exhibited in the Salone Satellite 2001, in Collina, L. and Simonelli, G. (Eds) *Designing Designers: Design for a local, global world – International Convention of University courses in Design 3rd Edition*, p249-255, Politecnico di Milano Publishers

Buchanan. R. 2005, Design as Inquiry: The Common, Future and Current Ground of Design in Redmond, J., Durling, D. and de Bono, A. (Eds) *FutureGround, Proceedings of the Design Research Society International Conference* Melbourne.

Dorst, K. 2005 Investigation of the Nature of Design Expertise, in Redmond, J., Durling, D. and de Bono, A. (Eds) *FutureGround, Proceedings of the Design Research Society International Conference*, Melbourne.

Feijs, L. and Kyffin, S. 2003, The Industrial Design Program and Faculty in Eindhoven: Competence based learning and designed intelligence, in Collina, L. and Simonelli, G. (Eds) *Designing Designers: Design Schools as Factories of Knowledge–International Convention of University courses in Design 4th Edition*, Politecnico di Milano Publishers

Green, L. and Benollo, E. 2003, Studio-Based Teaching: History and Advantages in Teaching Design, *World Transactions on Engineering and Technology Education Vol 2, No2 p1-4*

Ramirez, M, Andrews, T and Tonkinwise, C. Designerly PSS Design: Orientating designers towards sustainable system outcomes, In van den Berg, C and Tukker, A. Eds 2004. *Product Service Systems: Practical Value -Proceedings of the 2nd International SusProNet Conference.* Delft Netherlands

Talbot, J. and Pandolfo, B. 2003, Enhancing investigation and insight in design studio projects: 'The great divide'- a studio project case study, in Collina, L. and Simonelli, G. (Eds) *Designing Designers: Design Schools as Factories of Knowledge–International Convention of University courses in Design 4th Edition*, Politecnico di Milano Publishers