Ignorance, Environmental Education Research and Design Education

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Abstract

Introduction

Industrial Design education, beyond Art, Science and Technology

As educators of the designers of tomorrow we have a responsibility to provide an education that informs students about ways that they are able to work and live in more sustainable ways. In undertaking our roles as educators we need to understand that;

> Education for sustainable development addresses the complexity and interconnectedness of problems such as poverty, wasteful consumption, environmental degradation, urban decay, population growth, health, conflict and the violation of human rights.
>
> The task at hand is enormous, but vital if we are to ensure the creation of truly sustainable societies (Department of Environment and Heritage, 2005).

In taking up this challenge we must examine how our current approaches to design education either contribute to or hinder the development of a sustainable society. A useful starting point for this reflection is the paper published in this journal by Noel Gough (2002) and his notion of blind spots and blank spots. While this paper is not the place to rehearse his argument it is important to note that disciplines are prone to have gaps and/or silences in regard to knowledge from other disciplines. Here we accept that design has not developed any systematic engagement with the discipline of environmental education research and like Gough (2002) we argue that,

> By sustaining the conversation through which we illuminate each other's blind spots and blank spots we might be able to learn enough about our ignorance in/of environmental education research for particular people in particular situations to use its products sensibly.

While the Industrial Design profession is relatively new largely dating in Britain and European countries from the middle of the nineteenth century, so to is Industrial Design education. This is particularly true of the situation in Australia, where both the modern practice of the discipline and its tertiary education programs date from around the end of WWII. (Fry, 1988) "Green" or "Eco" Design in both practice and education is newer still. Even as recently as 2004 a review of the curricula of 14 Australian University design degrees found only 5 covering sustainable design issues (Ramirez, 2004). However some examples of good "green" practice do exist in local manufacturing and deserve to be celebrated. For example, Visy Industries is one of the largest manufacturers of recycled paper packaging world-wide and have devoted

resources to research in green design (they have Senior Research and Development Manager, Polymers and Recycling).

For design educators the challenge is how to mediate ecological concerns with techno-scientific imperatives. Within this challenge we must remain mindful that not to succumb to a temptation to go for the 'easy options' associated with sustainability through re-use. We are critical of any option that opts to frame solutions to sustainability issues in the re-use of waste material, e.g. necklaces out of bottle tops, rather than looking to the development of sustainable behaviours, of reducing waste or providing "…opportunities for imagining solutions that foster sustainable behaviours of production and consumption"(Ramirez, 2004). Thus, while re-use is one element of sustainability it is the reduction of waste in the production phase that we consider as having a greater impact in a sustainable society. Here we have avoided the discussion with the notion of reducing production of consumer items as design is, at least historically and currently, concerned with production. Such complexities act to focus design educators on some of their taken for granted assumptions, here we look at 3 blind spots that Gough's (2002) work has prompted us to identify.

In this paper we explore questions around the development of a design curriculum focusing on learning and development in design education, where, technical and innovatory design principles may seem to be at odds with environmental educational concerns in regard to ecological sustainability. First it is important to understand what we mean by design and design education. While the definition of what design is, and therefore what designers do, is still being debated within the field we use as our context the definition put forward by the International Council of Societies in Design (ICSID). ICSID tells us that:

> Design concerns products, services and systems conceived with tools, organisations and logic introduced by industrialisation – not just when produced by serial processes. The adjective "industrial" put to design must be related to the term industry or in its meaning of sector of production or in its ancient meaning of "industrious activity". Thus, design is an activity involving a wide spectrum of professions in which products, services, graphics, interiors and architecture all take part. Together, these activities should further enhance – in a choral way with other related professions – the value of life (ICSID, 2005).

It is possible to understand from this description that designers construct themselves as high end users of technology and techno-scientific drivers of development. There is a plethora of literature that argues that the environment (the relationship between the human and non-human world) is open to manipulation by the economic and techno-scientific drivers of the human world and that the techno-scientific drivers of this relationship are incompatible with the interests of humanity and nature ((Diamond & Orenstein, 1990), (Escobar, 1999), (Guattari, 1995a, 1995b), (Haraway, 1991), (Shiva, 1997), and (Soper, 1996)).

> The contemporary world...tied up in its ecological, demographic and urban impasses-is incapable of absorbing, in a way that is compatible with the interests of humanity, the extraordinary techno-scientific mutations which shake it. It is locked in a vertiginous race towards ruin or radical renewal (Felix Guattari 1995a:91)

The arguments put forward by these writers would construct designers as an ecological foe. But designers do engage in ecological concerns. ICSID (2005) reflects the sentiments of the United National General Assembly as quoted above and sets amongst its aims '…Enhancing global sustainability and environmental protection (global ethics).'

A key feature of design education, for example, is the dynamic relationship between intellectual and manual skills, what Kimbell (1995, p. 12) terms "thought-in-action." Many definitions of design try to reflect this (Black & Harrison, 1994); (Curriculum Corporation, 1994); (Raizen, Sellwood, Todd, & Vickers, 1995), and there has been research that indicates the appropriate implementation of design creates environments where powerful learning can occur (Fleer & Jane, 2004); (Ginns, Norton, & Davis, 2005). As noted by (Norman, 2000), p.90):

> '…design can serve as a framework and catalyst for teaching and learning strategies that promote innovative, high end thinking, cooperative teamwork, and authentic, performance assessment'

The importance of rich sensory and physical experiences for the development of design education is seen as essential for such outcomes to occur, and studies of real world design situations have provided insights into such experiences. (Rowell, Gustafson, & Guilbert, 1999), for example, in their study of engineers' perceptions of design and technology problem solving as a parallel to problem solving in the classroom, identify that "understanding emerges from participating in interaction with a problem situation, most often in a social setting" (pp. 115-116). (Davies, 1996) reaches a similar conclusion in his study of professional designers working with school students, and emphasised the need for active engagement in real design projects. These perspectives evoke images of the designer as a problem solver in relation to production but do not include (although they do not explicitly exclude) consideration of problems that deal with environmental sustainability.

The work of (Paechter, 1992) helps us to understand why design programs look the way they do. He highlights how teachers' prior knowledge and perceptions influence the way they define and implement design education. These findings are important because, as noted by (Lewis, 1991), the values brought to the definitions of design will "influence the way its content is defined, what goes in the curriculum, and how the subject is taught" (p. 144). If we accept that the style and scope of design curricula and classes can be heavily influenced by the teacher's subject background (Barak, Eisenberg, & Harel, 1995); (Rennie, Treagust, & Kinnear, 1992), then we can see the importance of including teachers with environmental education background in the development and delivery of ecologically focused design programs. Equally important, if we as design educators are to take seriously the work of environmental

education researchers we must examine how our current approaches to design education either contribute to or hinder the development of a sustainable society.

Rather than interpret the absence of ecological perspectives as a deficit on the part of teachers it is important to note that teachers of design often do not have the opportunity to work and interact with other design workers and practitioners nor do they have the opportunity to work with environmental educators. Hence their interaction is primarily with like-minded teachers or industry workers and they will often lack a strong basis of theory and practical educational skills. Lack of these skills may impair their efforts in producing appropriate strategies for implementation of environmentally aware design-oriented programs in schools. The work of Ginns, Norton and Davis (2005), for example, have explored a number of issues that impede and facilitate teacher approaches to design and the strategies that they develop in classroom environments. The current practice is to call upon Art teachers to design and implement school programs in design, which results in a bias towards creativity in Design, certainly, but tends to neglect the role of innovation and technical expertise in such programs. It is in effect a state of making do with what is available; it is not a case of making best practice happen. It should be noted that we are not concerned with what has come to known as Design and Technology in various educational institutions' curricula, as we see the conflation of the two as being counterproductive to our aims. School curriculum decompartmentalises various elements of design. When this happens, it is possible to identify technology educators who focus primarily (if not exclusively) on how to make things and how things go together, and material processes, all of which are important parts of the design process. It is arguable that teaching Technology as a stand-alone entity does not provide students with an opportunity to contextualise the nexus between Technology and aesthetic user needs marketing and creativity. Conversely a design curriculum that does not embrace technology is equally lacking. Hence, while we see that technological skills are integral to any design program, we do not see them as synonymous. The relative lack of theorists in the field of design education studies leaves unquestioned the relevance of conventional practices of design education that are premised on only tangentially relevant Art, Science and Information Technology models. Science education, for example, relies on a model of practice that is quite at odds with the aims of design education (Gibson, 1993) 1993,; (Harrison, 1994); (Lewis & Gagel, 1992).

Toward an environmentally focused design curricula

For us the distinction between blind spots and blank spots is somewhat blurred. We could argue that design education has blank spots in relation to environmental sustainability since sustainability issues have found their way into the curriculum over a number of years. Yet such understandings have come from the perspective of academics that are personally committed to ecological issues. As a result the entry into the curricula is not systematic and would easily be lost if these particular individuals were no longer involved in the program. Even then, a commitment to ecological issues does not necessarily mean that these individuals have systematically engaged with the questions that have been formulated, theorised or discussed by environmental education researchers so it is very likely that they have a naïve understanding in relation to the incorporation of environmental education understandings into the design education curriculum. In order to enter this discussion

with environmental education researchers we need to define what it is we do as designers and design educators, here we pay particular attention to Industrial Design.

Blind spot 1: Tunnel vision

Conversations regarding sustainability and environmental concerns were not introduced to the design profession until 1969 when Victor Papanek wrote his germinal text *Design for the Real World* (Papanek, 1971). In that book he highlighted that there was no text (book, journal or other) articulating the ecological or ethical responsibilities of the designer. Papanek highlighted the Design professions' first blind spot; a resistance to review literature and consequently learn from alternate disciplines. In many ways, the situation has not changed; design education is still taught in specific faculties or art colleges where sustainability and environmentalism is marginalised due to a lack of space within the curriculum and/or a shortage of knowledgeable and available design professionals capable/qualified to teach into the programs.

Blind spot 2: Quasi-theorists

At a theoretical level however, the situation has changed; key conferences, summits, societies and texts of global significance highlight the role design could play in assisting, for example, the development of government policy, the developing world, waste reduction and energy consumption (ICSID 2005). Theory is often of a global, grand scale one that promotes links with politics, requires humankind to change its perspective, is in essence, Idealist. When introduced into Design education, students attempt to replicate such idealism, often with great flair and passion. It could be argued that this is Design Educations second blind spot: Students become quasi theorists to the detriment of demonstrating immediately employable skills within a profession largely dependant upon manufacturing and consumerism.

Blind spot 3: Reuse rather than reduce

In Germany, government policy has almost eradicated the manufacture or import of non-environmentally friendly products. Within Australia and in the absence of such strict government policy, the Design Institute of Australia (DIA, 2005) has published a set of guidelines linked to environmental design and product innovation. The guidelines are far more pragmatic than conversations at premier conferences; they promote key strategies steps and tools developed to introduce practising designers to Design for Environment (DfE) (DIA, 2005). The guidelines highlight the complexities and timeframes associated with sustainable new consumer product development. When faced with such levels of complexity, many design students, consultancies and lecturers tend to focus upon less daunting projects that aim to deliver knowledge of sustainable design but in practice provide little more than a repositioning of third world practice; utilising found components in new products, identifying secondary uses for discarded products, utilising waste At best focus is placed upon extending the product to grave lifecycle as opposed to preventing waste in the first place, thus highlighting Designs 3rd blind spot: it is easier for students to understand how to reuse waste rather than to reduce waste.

An example of waste reduction can be found in new production techniques of a well known local furniture company using new ICT for positive ecological benefits. In the past they have had lots of waste generated in the cutting of fabrics and leather for their chairs and sofas. This waste was passed on to other companies to reuse in various

small crafts projects. The final outcomes were increased costs for the furniture company and indifferent crafts objects being made purely to soak up the waste, not because there was any demand for pin cushions and tea cosies! Now, however, new computer software has allowed them to cut their fabrics in a more efficient manner, reduce waste and reduce costs.

Environmental education for design education

The concept of environmental education in Australia is not new and, according to Annette Gough (Gough, 1997) dates back to 1970. Environmental education has drawn on the growing strength of the environmental movement over the past twenty five or so years. One of the central aims of both the environmental movement and environmental education is the development of meaningful strategies to deal with the degradation of nature. Environmental groups such as the Australian Conservation Foundation, Greenpeace and the Wilderness Society have worked progressively to politicise environmental and ecological issues at governmental and private levels in the hope of stopping the irreversible degradation of the natural and built environments (Peace 1996). Environmental educators have argued for, and worked towards the development of strategies within schools and the wider community that 'empower' people to make informed decisions on ways to prevent irreversible damage (Fien, Robottom, Greenall Gough, & and Spork, 1993).

The blind spots and blank spots of the Australian design profession are resonated in design education. The Faculty of Design has a proud history of Industry relevant courses. The design curriculum is developed and reviewed in the context of a Curriculum Advisory Committee. That Committee is comprised of practising designers and academics within the Faculty. Thus, the curriculum is a reflection of those matters considered important to that Committee. If we accept that consumerism has been the primary concern of the design profession in Australia and that design education has been concerned with meeting the needs of the design profession, then it is not difficult to locate the blind spot that design education has had in relation to sustainability. A potential for research in environmental education becomes evident.

As design education researchers we need to enter into a discussion with environmental education researchers. This discussion might address issues such as design based only in consumerism is not sustainable. That discussion must address notions that industry (the employers of designers) wants products that sell. We need to engage with environmental education research in ways that help us as not only design researchers but also design educators and design education researchers to develop courses that promote ethical and sustainable design.

How might this affect future developments in the Faculty

The Swinburne Higher Education Division has recently been restructured with a view to creating more opportunities for unique educational programs that build upon interdisciplinary links between alternate faculties. Such programs will be accredited on the basis of evidenced industry demand and approval from an external course advisory committee primarily comprising of industry representatives. The Faculty of Design will for the first time in its history face the challenges of providing Design education to non-designers or individuals who seek to add elements of design to their undergraduate program with no intention of entering the design profession; this will primarily manifest itself in postgraduate programs developed for graduates of non-

design based undergraduate programs such as Engineering or Business and the development of double degrees linking core activity from two or more faculties. The developing field of environmental design will act as a catalyst for such inter-faculty synergies whilst creating a blue print for an entirely new design curriculum; one in which traditional designer skill, knowledge bases and attitudes are repositioned to focus upon environmental concerns.

In providing design education to non-designers, the faculty will be faced with the challenge of developing subjects that contain transferable strategies for sustainable innovation, entrepreneurship, lateral, pragmatic and creative approaches to developing appropriate solutions for both current and future industry needs. The curriculum will shift with emphasis placed upon intellectual capital rather than vocational skills such as model making and rendering. Undergraduate students will engage in the development of complex scenarios, focussing upon designing product services and systems design (PSS) rather than conventional consumer products. With emphasis placed upon environmentalism, there will be an initial mismatch of graduate attributes and the immediate needs of local industry; it is envisaged that many local manufacturers are not preparing for or fully aware of environmentalism. Such manufacturers will initially seek to engage in-house designers or design consultancies that specialise in traditional product development; this demand could initially be met by the development and supply of more advanced inter-sectoral programs such as Associate Degrees in which the pragmatic skill based perspective of the TAFE sector is linked with the intellectual rigour of the Higher Educational sector.

Initially the faculty will seek to build upon interfaculty/sectoral opportunities to win ARC and CRC research grants linked to environmental design. Such activity creates opportunities for knowledge transfer into educational programs; providing appropriate environmental design educational programs will largely depend upon conducting primary research, as there are no existing Australian environmental design programs.

The diversity of activity linked to environmental design will also begin to shift current boundaries associated with design based refereed journals. Design-based papers will begin to be published in non-design-based journals, partly due to co-authorship opportunities linked to inter-faculty research activities but more importantly linked to a conscious shift in focus towards the role of design in non-traditional industry sectors. A shift of this magnitude should place pressure upon the government to review the reporting categories linked to design within the planned Research Quality Framework (RQF) exercise and within Australian Council of University and design Schools (ACUADS).

Environmental Research increasingly underscores every subject undertaken at the Faculty of Design at Swinburne. For example, the Faculty is the only tertiary design provider in Australia to be involved in a CRC. Entitled the *Cooperative Research Centre for Wood Innovations*, it is a project comprised of Academics, Post-Graduate students and Industry partners. And so important are environmental issues to the Faculty, in recent Government policy, and in the Australian public at large, that a new research direction in sustainability has just been introduced. According to the 2003-2004 Annual Report (Innovations, 2004): '…there has been a shift in public attitudes towards forest industries, with increasing recognition of their potential to offer solutions for a sustainable environment.'

Two current PhD projects demonstrate the importance of sustainability to product designers. One of these which originally focused on finding ways of using waste

resources to create manufactured objects, has changed to a focus that encourages manufacturers to design ways of creating less waste at the very beginning of the design and manufacturing process. And the best way of doing this, it is argued, is to change the Australian Standards relating to product design and manufacturing thereby ensuring industry take notice.

Another student's review of the window frame industry for the CRC is closely linked with the introduction of energy rating requirements for the construction industry. Unlike in the countries of the Northern Hemisphere where double glazing keeps heat inside buildings, he has identified a huge potential market in warmer countries such as Australia in using timber-framed double glazed windows to keep the heat out!

So the CRC, and the Faculty, have a new research direction in sustainability. The two PhD projects cited highlight environmentalism within the design process in a manner that deals with the hard issue of creating less waste, and not utilising the waste to create new, and often substandard, products. Interestingly, neither of these issues was identified at the start of the CRC in 2002, but have become high priority issues if the CRC is to continue and keep the support of Government and enlightened Industry players.

This brings us back to the original argument in this paper, can environmental education researchers offer advice to the design education area that may help us identify our blank or blind spots in relation to environmental education. The newness of ecological concerns in the design research and design education areas means that we have a great deal to learn. Will the framing of these areas come from science, engineering or environmental education research? The notion put by Gough that we engage in conversation with environmental education researchers in an effort to illuminate our blind spots is very attractive. If environmental education researchers are able to assist us with our reflections on designing curricula that in turn encourages a more ecologically aware design profession then this would be a worthwhile contribution to design practice in Australia, and indeed the world.

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