

Ignorance, Environmental Education Research and Design Education

Deirdre Barron[†], Simon Jackson & Lyndon Anderson

Swinburne University of Technology

Abstract

In the relatively new discipline of design education we have the opportunity to frame the way that design education is formulated. 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. There is a gap in design education development regarding how to mediate ecological concerns with techno-scientific imperatives. Environmental education researchers can influence this new field by challenging existing approaches to design education with particular attention to the ways design either contributes to or hinders the development of a sustainable society. In order to enter this discussion with environmental education researchers we identify three ecological issues faced by designers and design educators, here we pay particular attention to Industrial Design. The question for this paper is, can environmental education researchers offer advice to the design education area that may help us develop ecologically sustainable design-based programs. The newness of ecological concerns in the design research and design education areas means that we have a great deal to learn. 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.

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).

[†]*Address for correspondence:* Dr Deirdre Barron, Research and Research Studies Coordinator, Faculty of Design, Swinburne University of Technology, Prahran Campus, 144 High Street, Prahran, Victoria 3181, Australia. Email: DBarron@groupwise.swin.edu.au

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 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 too 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 a 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 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 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, p. 1). 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 design assumptions 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.

As an emerging field distinct from architecture and the fine arts, proponents of design have sought the theoretical underpinnings necessary to establish it as a discipline in its own right. Perspectives from other disciplines, particularly the two broad areas of science and cultural studies, influenced this pursuit of "design theory" (Whitfield, 2005, p. 3)

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 (2005) 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.

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; Soper, 1996).

The contemporary world ... tied up in its ecological, demographic and urban impasse—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, p. 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 which many definitions of design try to reflect (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, pp. 115–116) 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.” 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, p. 144), 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." 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, 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 be known as Design and Technology in various educational institutions' curricula, as we see the conflation of the two areas 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 (Anderson & Jackson, 2005). 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 (Gibson, 1993; Harrison, 1994; Lewis & Gagel, 1992).

Toward an Environmentally Focused Design Curricula

We could argue that design education has not paid sufficient attention to environmental sustainability yet 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 identify 3 ecological issues faced by designers and design educators - here we pay particular attention to Industrial Design.

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 (1971) highlighted the Design professions' 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.

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, and is in essence, idealist. When introduced into design education, students attempt to replicate such idealism, often with great flair and passion. Students become quasi-theorists to the detriment of demonstrating immediately employable skills within a profession largely dependant upon manufacturing and consumerism.

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. Our experience as design educators is that 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 craft 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

Ecological blindness in the Australian design profession is resonated in design education. The history of industry relevant courses in the design field has meant that design curricula is developed and reviewed in the context of curriculum advisory committees. Such committees are comprised of practising designers and academics. 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 understand why design education has not paid particular attention to sustainability. One way forward is for design educators to become environmental educators. While this may be the optimum approach, the increasing workloads within the academy may mean that design educators spend a great deal of time identifying issues and solutions that have already been theorised by environmental education researchers. The potential for cross-disciplinary research in environmental education and design education may provide greater insights and faster changes to curriculum development than working within silo disciplines.

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.

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 develop ecologically sustainable design-based programs? 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 Art, Science, Engineering or Environmental Education research? If environmental education researchers are able to assist us with our reflections on designing curricula that would in turn encourage a more ecologically aware design profession.

Keywords: design education; green-design; eco-design; sustainability.

References

- Anderson, L., & Jackson, S. (2005, August 15–18, 2005). *Teaching design and engineering: A review of product design engineering programs offered through the Faculty of Design, Swinburne University of Technology*. Paper presented at the International Conference on Engineering Design, Melbourne.
- Barak, M., Eisenberg, E., & Harel, O. (1995). What's in a calculator? An introductory project for technology studies. *Research in Science and Technological Education*, 13(2), 147–154.

- Black, P., & Harrison, G. (1994). Technological capability. In F. Banks (Ed.), *Teaching technology* (pp. 13–19). London: Routledge.
- Curriculum Corporation. (1994). *Technology: A curriculum profile for Australian schools*. Carlton: Curriculum Corporation.
- Davies, D. (1996). Professional design and primary children. *International Journal of Technology and Design Education*, 6, 45–59.
- Department of Environment and Heritage. (2005). *Extending the vision: Australian Government engagement with the UN Decade of Education for Sustainable Development 2005–2014*. Retrieved June 1, 2005, from <http://www.deh.gov.au/education/publications/vaee-05/index.html>
- DIA. (2005). *Design guidelines*. Retrieved June 1, 2005, from <http://www.dia.org.au>
- Diamond, I., & Orenstein, G. F. (Eds.). (1990). *Reweaving the world: The emergence of ecofeminism*. San Francisco: Sierra Club Books.
- Escobar, A. (1999). After nature. *Current Anthropology*, 40(1), 1–38.
- Fleer, M., & Jane, B. (2004). *Technology for children (2nd ed.)*. Frenchs Forest: Pearson Educational Australia.
- Fry, T. (1988). *Design History Australia 1788–1970*. North Ryde, NSW: Craftsman House.
- Gibson, J. (1993). Contexts for the development of appropriate technology education curriculum. *Pacific-Asian Education*, 5(2), 23–32.
- Ginns, I. S., Norton, S. J., & Davis, R. S. (2005). *Teacher change in response to student learning in technology*. Paper presented at the Fifth International Primary Design and Technology Conference – Excellence through enjoyment, Birmingham.
- Gough, N. (2002). Ignorance in environmental education research. *Australian Journal of Environmental Education*, 18, 19–26.
- Guattari, F. (1995a). *Chaosmosis*. Bloomington: Indiana University Press.
- Guattari, F. (1995b). *Chaosphy*. New York: Semiotext(e).
- Haraway, D. (1991). *Simians, cyborgs, and women: The reinvention of nature*. New York: Routledge.
- Harrison, M. (1994). Science and technology: Partnership or divorce? In F. Banks (Ed.), *Teaching technology* (pp. 238–245). London: Routledge.
- ICSID. (2005). *Definition of Design*. Retrieved from http://www.icsid.org/about/Definition_of_Design/
- Lewis, T. (1991). Introducing technology into school curricula. *Journal of Curriculum Studies*, 23(2), 141–154.
- Lewis, T., & Gagel, C. (1992). Technological literacy: A critical analysis. *Journal of Curriculum Studies*, 24(2), 117–138.
- Norman, J. (2000). Design as a framework for innovative thinking and learning: How can design thinking reform learning? In E. W. L. Norman & P. H. Roberts (Eds.), *Design and technology educational research and curriculum development: The emerging international research agenda* (pp. 90–99). Loughborough: Loughborough University.
- Paechter, C. (1992). Subject subcultures and the negotiating of open work. In R. McCormick, P. Murphy & M. E. Harrison (Eds.), *Teaching and learning technology* (pp. 279–288). London: Addison-Wesley.
- Papanek, V. (1971). *Design for the Real World*. New York: Pantheon Books.
- Raizen, S. A., Sellwood, P., Todd, R. D., & Vickers, M. (1995). *Technology education in the classroom: Understanding the designed world*. San Francisco: Jossey-Bass Publishers.

- Ramirez, M. (2004). *Ecological sustainability in Australian industrial design education*. Paper presented at the FutureGround, Monash University, Australia. Retrieved June 1, 2005, from <http://www.fbe.unsw.edu.au/staff/Mariano.Ramirez/futureground.pdf>
- Rennie, L. J., Treagust, D. F., & Kinnear, A. (1992). An evaluation of curriculum materials for teaching technology as a design process. *Research in Science and Technological Education*, 10(2), 203–217.
- Rowell, P. M., Gustafson, B. J., & Guilbert, S. M. (1999). Characterization of technology within an elementary science program. *International Journal of Technology and Design Education*, 9, 37–55.
- Shiva, V. (1997). *Biopiracy: The Plunder of Nature and Knowledge*. Boston: South End Press.
- Soper, K. (1996). Nature/nature. In George Robertson et al. (Ed.), *FutureNatural* (pp. 22–34). London: Routledge.
- Whitfield, T. W. A. (2005). Aesthetics as pre-linguistic knowledge: A psychological perspective. *Design Issues*, 21(1), 3–17.

Copyright of *Australian Journal of Environmental Education* is the property of Australian Association for Environmental Education and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.