Chapter 30
'Growing Oak Trees' – Education for Sustainable Design:
Building a Sustainable Design Literacy in Undergraduate and Professional Designers

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ABSTRACT

Designers and engineers seem finally to be awakening to the challenge that sustainable development presents. Educators and students alike are keenly aware of the need to become more effective in the training and practice of their specific disciplines with respect to sustainability (Mulder, Segalas-Coral, & Ferrer- Balas, 2010). This chapter illustrates and animates a number of critical themes in education for sustainable design that have been developed within the Irish context. However, these are scalable within the international context for training and 'up skilling' of product designers, engineers and other design professionals. The chapter focuses on the co-design, development, validation and piloting over two years of a CPD (Continuing Professional Development) course for Design Professionals in Sustainable Design. The research outlined in this work also qualitatively assesses appropriate models for educating for sustainable design thinking with design professionals, small to medium enterprise (SME) employees and undergraduate design students. The educational methodologies that were developed were evaluated over an eight year period with case study groups including: Industrial and Product Design undergraduate students at the Institute of Technology, Carlow (IT Carlow) and Professional designers taking the SDI (Sustainable Design Innovation) Certificate at IT Carlow. A parallel program (Winnovate) which aimed to up skill SME's in the South East of Ireland was also developed as a separate case study. All the case studies were benchmarked against initiatives in the Netherlands, Germany, Spain, Wales and Australia as well as collaboration with the University of Limerick, Ireland as a means of establishing current best practice.

INTRODUCTION

Product and Industrial Design lie at the interface between the humanities, engineering, business and technology. As disciplines they strive to offer the world more accessible, user friendly and aesthetically desirable products and product service systems. What is now clear however is that without sustainable thinking at its core, neither design, engineering, business nor technology have the ability to achieve much more than a continuation of the sociological and environmental difficulties of the 21st century.

Design for sustainability (DfS) in its broadest sense attempts to consider the environmental, social and economic impact of any product or product service system. This requires a holistic overview of the impacts that are incurred at each stage of a products life from manufacture through the supply chain to the use phase and ultimately at the end of the product life. DfS differs from Eco or Green design as it tries to consider user impact and social considerations as well as the long-term economic viability of a design. DfS offers designers and users the opportunity to influence mainstream market driven consumption patterns and to redirect users towards more sustainable usage habits in their everyday lives. For many years DfS has given society the means of developing innovative enterprises based on real world needs (Papanek, 1971).

In the past eight years since this research has developed there has been a marked change in the mass market appeal for sustainable products and services. Implementation of sustainable design practice from both recent graduates and also innovative Small & Medium Enterprises (SMEs) at a local level is slow. With the SME sector alone comprising the bulk of industry within the European Union (EU) varying in some countries from 80-95% of the total numbers of companies (Tukker, 2000), the potential exists for addressing sustainability challenges at this level. It was assumed that consumer demand alone would push a change in business practice, but the evidence suggests that the complexities of sustainable design, along with the lack of experience in the field are providing barriers and opportunities to designers and marketers alike (Cook, Bhamra, & Lemon, 2006; Nidumolu, Prahalad, & Rangaswami, 2009).

There are however growing indications (de Eyto, 2010) that business has a keen appetite for graduates who have a sustainable literacy as an integral part of their undergraduate skill set. There is also evidence to suggest that businesses are starting to address the lack of capacity in sustainable design practice. These industries by their nature find it difficult to dedicate expertise solely to sustainable development issues.

The strategy outlined in this chapter introduces concepts of holistic sustainable design thinking and practice to both SMEs and undergraduate students. An holistic learning approach is advocated which develops the 'sustainable literacy' of the learners with a view to better preparing them for the changing nature of their careers and their clients priorities.

The research outlined here shows how, given the appropriate learning environment, a sample of the current and next generation of designers and business decision makers are slowly developing a range of skills to help them deal with the broad and varied issues around sustainable development. And that they are taking on the mantle of deciding what key decisions to make regarding the sustainable manufacture and design of consumer products that the world continues to use.

This chapter outlines a selection of teaching methods being developed and applied by the author in the context of Irish undergraduate design students, design professionals and SME representatives from the manufacturing sector in Ireland. These methods and educational models were developed and piloted over a five year research period (2005-2010) as part of a larger doctoral study.

It is felt that the methods outlined in the chapter, while still on-going in development, may contrib-

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