

CONNECTING SUSTAINABILITY TO THE DESIGN PROCESS

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ABSTRACT

This paper presents the finding of a research investigation into how sustainable objectives can be incorporated into a design brief. It is based upon the development and trial of a pack of Eco-Design Cards. The initiation of the research was a feeling that some of the strategies, tools and processes within Eco-Design are cumbersome and inappropriate. That is, they are data intensive and rely on a scientific or quantitative approach to both strategies and assessments. Many are retrospective and assume that the product already exists or is well defined. All of this runs contrary to the intuitive way in which designers work. Designers work quickly whereas many of the strategies available are slow in execution. The intention was to learn from these yet produce a method by which sustainable methods could be introduced to design students. A qualitative approach which introduced the themes of sustainable design early in the development cycle was required. This view had been emphasised while teaching Sustainable Design Tools & Strategies to Year 2 BA(Hons) Product Design Students at UCCA. The resulting research reflected on what exactly 'sustainable design' is and how to introduce practical solution pathways to design students. It continued with the development of a pack of cards which were trialled with students both familiar and new to sustainability. The results of the trials and a reflection on the complexity of sustainable design and the value of the cards raised form the conclusion of this paper.

1 CONTEXT/BACKGROUND

As a practising product designer and lecturer I am acutely aware of the need to integrate sustainable strategies into the design process. Research has shown that:

No matter where in the product life-cycle the impact lies, most of the impact is 'locked into the product at the design stage' [1]

It is important that designers are not only aware of sustainable issues but are in a position to set realistic target in the early stages of design origination. That is to understand what targets should be set for a given design challenge and the methodology by which these goals can be achieved. Having taught a unit 'Sustainable Design Tools and Strategies' for year 2 Product Design Sustainable Futures students at UCCA, the author had come to the conclusion that the available material was not conducive to this process. That is most of the available tools were either retrospective or comparative. Some allowed you to define broad goals but few linked these to sustainable design methodology. This project started with the grandiose purpose of creating a blueprint of methods for sustainable development which could be utilised in the brief setting stage of design, seamlessly integrating sustainable principles into the design process.

The project concentrated on students as they are the rising generation who can influence the design profession by bringing new ideas to the discipline. They are also aware of sustainability but need the mechanisms to move from principles to practice. There is often a gulf between the two. To be effective, sustainability has to be part of mainstream thinking. The aim was twofold:

1. To allow realistic sustainable targets to form part of the design brief.
 2. To prompt awareness and debate about what sustainability is in a context design.
- The aim was to combine the 'why' of sustainability with the 'how' of implementation. Designers need to be convinced of both objectives and how these can form a roadmap to success. All too often the aims and outcomes are not connected in a coherent pathway.

2 DECISIONS ON WHAT SUSTAINABLE DESIGN IS AND OMISSIONS TAKEN WHILE DEVELOPING THE CARDS

The initial task was to review available material and decide what aspects of sustainability were to be included and what aspects could be left out.

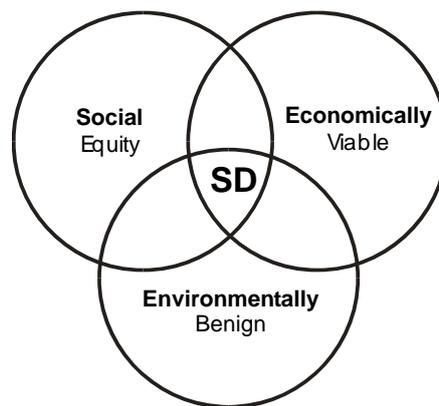


Figure 1 The Three Systems of Sustainability

The original intention was to create packs of cards for each of the three systems within sustainability: ecological, economical and cultural. However the project concentrated on ecological cards for the following reasons:

1. Cultural cards become too numerous and also start to be a road map for the complete design process. This may create confusion and also distract from the original purpose of the cards; that of a quick entry point to sustainable design.
2. The IDEO Method Cards [2] and other material cover some of the issues within the cultural system.
3. Cards within the economic system challenge some of the existing paradigms by which we have structured commerce and society. These become a personal viewpoint and may alienate some designers and limit the user base. Some advocates of sustainability argue that it can be achieved within existing frameworks while others cite the current economic pattern of production and consumption as the cancer not the design process.

However the cards do touch upon some of the wider equity issues as there are shared issues inherent within the systems as denoted Figure 1.

The initial step was to gather or compile lists of all development strategies associated with sustainable design. An initial step was to conduct a literature review. Key texts consulted included The Okala Design Guide (2004) gives an overview of why we need Eco-Design and touches on current practices [3]. In Cradle to Cradle, McDonough & Braungart (2002) create a design philosophy which encapsulates the environment within an economic framework as the triple bottom line [4]. They continue with an approach which promotes waste as raw material, or a cradle to cradle approach. Tischner (2000) has produced the most comprehensive guide to eco-assessment and relies heavily on a quantitative approach [5]. A contrast to this is Datschefski (2001) who has created five subjective ways of assessing the eco credentials of a product [6]. Lewis & Gertsakis (2001) is perhaps the most balanced outline of both quantitative and qualitative strategies and assessment methods [7]. Few of these strategies can be utilised as a creative stimulus whereas all can be utilised to clarify claims of eco-credentials once a product exists. In conjunction to this colleagues and experts in the field were also consulted for sustainable 'best practice'. Each strategy or ambition was written on a post-it note and placed on A1 boards. The next step was to eliminate repeats and then group strategies together under common themes, one per board. The ultimate design challenge was to consider ways in which the information should be portrayed in an easily accessible and engaging manner.

The gist of this project was understanding the complexity of eco-design. Part of this understanding was gained by trying to see material use from the perspective of a designer and not use the language of an ecologist. An intriguing struggle was putting together a comprehensive list of objectives and strategies and the reasoning behind the choices and the categorizing of them. This quickly highlighted the problems of a comprehensive panacea approach. The initial idea of creating a hierarchy of cards starting with ambition cards as an overview and then method cards as a 'how to do guide' was dropped as this increased complexity. A need to make strategies quickly accessible to designers unfamiliar to sustainability was counter to some of the more complex methodologies. This re-focussed the project, which now aimed for entry point understanding and breadth rather than a complete guide.

Another drawback to the panacea approach is that the cards became too information dense and their use non-spontaneous. It was for this reason that the initial aim of putting references to further information and where in the life cycle of a product the strategy was most appropriate were dropped from the final version of the cards.

Another concern was the possibilities of misinforming the user. That is if the cards are seen to cover all possibilities within eco-design then the user of the cards may miss an important opportunity of a new approach. The other 'tricky' issue is the fact that there is no attempt to quantify the environmental impact reduction by selecting one cards strategy over another. It may be that selecting a number of cards, although sensible to a development and achievable, have little impact on a products ecological footprint.

Another debate implicit within the cards is where are the boundaries set? That is the normal domain of designers is manufacture and use whereas sustainable thinking encourages 'Lifecycle Thinking' and even replacement of a physical product with a service or system. Would the cards tacitly imply that designers ought to influence the bigger picture?

3 THE CARDS

The cards have been divided into four categories or packs:

1. MATERIAL USE – can we achieve zero impact?
2. Can we EXTEND THE LIFE OF THE PRODUCT
3. Life-cycle thinking includes DESIGN FOR DIS-ASSEMBLY

4. We want to increase EFFICIENCY

A Slogan was selected for the front which gave an overview of ambition and an explanation of possibilities. Inside were details of differing approaches to the slogan. The category slogans are issues which designers influence and understand rather than an 'objectives list' from an ecologist's perspective. The reasoning behind the selection of these categories is simply that they make sense to designers, create a framework for eco possibilities and are manageable in that no pack has more than eight cards.



Figure 2 Format of Card



Figure 3 Typical Front of Card

Toxic materials can affect the health of the manufacturer and user, while creating problems for the environment in disposal.



Figure 4 Typical Inside of Card

To use effectively the design challenge needs to have been identified. The cards are then used by a design group to consider the environmental impact of that development. They will consider each card and the possibilities included, either rejecting or accepting the ambitions and strategies into the project brief. A key point is it gets the design team talking about eco-design at the brief stage (or before) rather than later or even at the end of the design. These cards either on their own or by further research, will become part of the projects briefing document and act as reminders during the development process. There will be fluidity in use, in that the group of designers (or others) can decide how many objectives they will identify, whether they are all from the same category or even if they will carry the same weighting.

It is the intention to leave ambiguity within the cards content to promote discussion and evolution of the cards. It also allows groups to add their own ecological aspirations in response to the developments unique possibilities.

4 THE TRIALS

Trials to evaluate the Cards were conducted with year 1 product design students both familiar with and those new to the subject of sustainability. With students familiar with the principles of Sustainability a project was set which challenged students to create as many 'eco improvements to an existing product as possible. The necessity to include eco thinking and material usage was introduced through a lecture and then students, in groups, brainstormed potential solutions using the cards to consider possible design directions. Individual students then had a week to respond with one idea per A3 sheet. With students unfamiliar with Sustainability eco-design requirements were added to a standard design brief, that of a torch. Again the need to consider materials was introduced through a lecture after which students in groups discussed how they could incorporate strategies into their projects using the Cards as both a check list of possibilities and as a stimulus for wider discussions about eco objectives. With this trial students had two weeks to develop their design solutions. Part of the final submission was to articulate what material improvements had been incorporated into the design. After these trials students completed a questionnaire which along with personal observation and video footage of the initial sessions informed the final design of the cards. In both trials students felt that the cards improved their knowledge of eco design and helped them incorporate this into their design responses.

5 REFLECTION AND FUTURE

Ultimately it is only quantitative methods that can benchmark a product's sustainable credentials. The cards are designed to complement these tools and ensure that more designers are aware of the possibilities within sustainable design. Initially the intention was to indicate where in the lifecycle of a product a strategy could be utilized and where to gain further information. However this approach was dropped after the trials as participants felt that this made the cards too cumbersome. The cards evolved into a quicker 'snap shot' approach that keeps the attention of the users rather than the ultimate answer to eco-design. This in some ways limits the use of the cards but also facilitates a wider audience. Since the trials the cards have been used effectively with groups of Ceramic Design students.

It is acknowledged that many approaches to sustainability have been missed. Also new methods and approaches will develop. It is the hope that the cards will be flexible enough to allow for inclusions and adjustments through time.

The greatest change to the initial ambition of the project was to realise the cards value lies in introducing the eco-design debate to designers. That is many designers would

like to know more but do not have access to information. The cards are a quick way to disseminate information allowing designers to engage positively with the issues. This was proved with the second trial where students, in a very short period of time, were introduced to the complexity of the subject and managed to make it relevant to their own work. As such the author feels that the primary value of the cards are a stimulus to education and debate with a development tool a secondary function.

It also became apparent during the trials that recipients may suffer information overload. That is the eight cards selected seemed enough for discussion, while the whole pack is 32 cards. There are two possible ways of negating this issue, firstly to only present a pre-selected number of cards and secondly to design some form of activity such as a game rather than a discussion into the cards application.

The value of the cards is in helping students formulate development possibilities in conjunction with standard requirements within a product design brief. The most appropriate time to use the cards is when students are researching and evaluating the requirements of a brief prior to commencing with design responses. It is recommended that they are used as a stimulus for debate and formulating individual strategies within a group discussion, rather than a prescribed checklist of how to do eco design.

The cards are still embryonic and the future intention is to continue with the visual impact of the cards while working on simplifying the messages to encompass those designers who may be put off by complex statements. The speed with which students understood and used the cards was encouraging and supportive of the project outcomes.

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