

COMMUNICATING ECODESIGN WITHIN ELECTROLUX – A CASE STUDY

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1 Introduction

The work presented in this paper is part of an on-going, three year, collaborative research project between Cranfield University and AB Electrolux, sponsored by EPSRC. The overall aim of this project is to develop a 'tool' for industrial designers working within the Electrical/Electronic product sector to enable them to undertake ecodesign more easily.

Traditionally environmental issues were considered to be the realm of technologists, and were dealt with at the production or engineering stages of the PDP. Research then identified that to be successful, ecodesign should be considered at the early stages of the PDP, where the brief is most flexible (Bhamra, Evans et al., 1999). These early stages include the discipline of Industrial Design (ID) (see Figure 1).

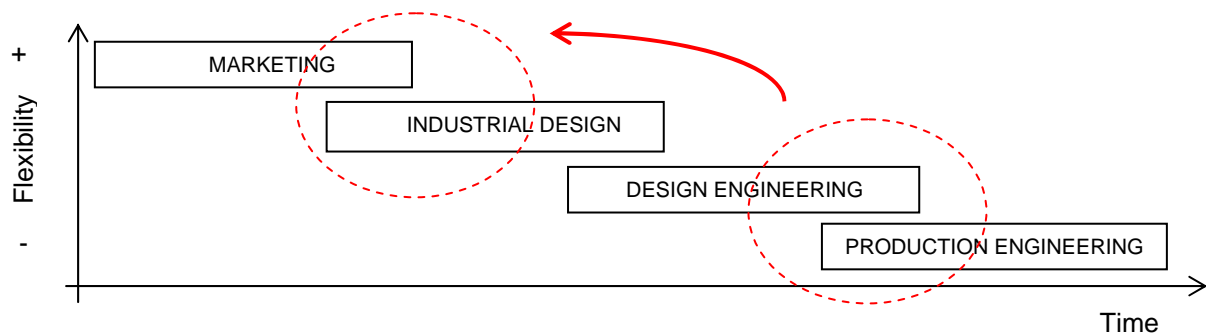


Figure 1 Illustration to indicate how the focus of ecodesign has moved towards the earlier stages of the product development process

In addition to this two further reasons for involving industrial designers in ecodesign, have been since been identified;

- Potential to add scope to the designed product
- Interface between product and user

Added scope equals added value

It is believed that industrial designers have the potential to add scope to the designed product because they draw from wide range of fields; mechanical design, marketing, psychology and artistry (Bates and Pedgley, 1998; Lofthouse and Bhamra, 2000). The added scope available to industrial designers, compared to the specialist expertise of design engineers, provides the opportunity for new

dimensions to be added to the ecodesign solution, in much the same way as the introduction of industrial design had on the overall quality of the products developed during the Industrial Revolution.

Interface between product and user

Industrial designers influence the interface between products and people, they are the link between supply and demand. As such they can influence through the use of styles and tastes (Mackensie, 1997) and "...change the way people use and respond to... goods or services" (Dewberry and Goggin, 1996). This means that, with an understanding of need versus desire, industrial design could be heavily influential on reducing consumption levels, a major issue for sustainable development.

LCA studies have identified that for the majority of domestic, electric, consumer, products the use phase is responsible for the most environmental impact.

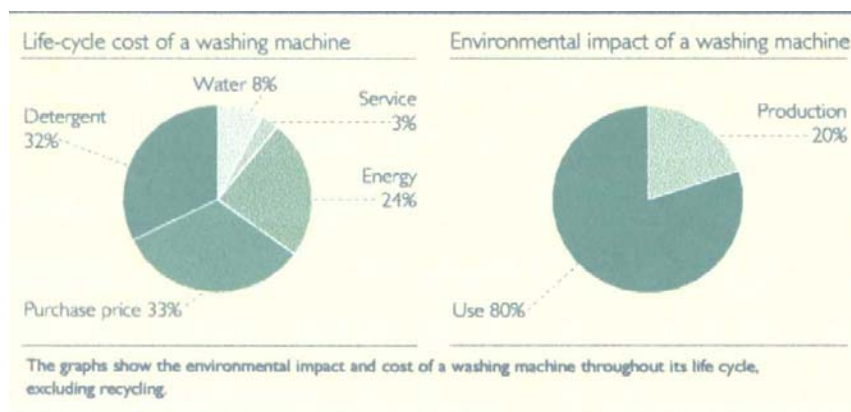


Figure 2 Impact of the Use Phase of a washing machine (Electrolux, 1997)

The findings from a DECADE project (Domestic Equipment and CARbon Dioxide Emissions) conducted at Oxford University's Environmental Change Unit (ECU - Environmental Change Unit, 1997) identified,

"...For washing machines it is the frequency of wash, the quantities loaded, the wash cycles selected and the quantities of detergent used. For the cooker the factors are dietary habits, whether lids are used with pots, how long ovens are heated before and after cooking, and the number of times oven doors are opened to check food." (Sherwin and Bhamra, 1998)

In other words, it is the consumers behaviour which is having a large influence over the environmental impact of these domestic products and hence industrial designers have an important role to play.

As a result of this current thinking a number of the most proactive companies, such as Philips, Electrolux, Sony and Xerox, now believe that involving industrial designers in ecodesign can lead to more all round successful solutions. However, despite this, research has shown that many companies do not have the appropriate mechanisms to integrate ecodesign into the early

development stages and also that there is a lack of appropriate tools (Bhamra, Evans et al., 1999). A previous paper from this project, presented at the 2001 Desire, Designum, Design Conference in Aveiro, Portugal (Lofthouse and Bhamra, 2001) reports in more detail on the findings which led to the instigation of this research project. This paper will summarise the findings from the empirical research which fed into the development of the pilot tool, and briefly introduce the tool as it stands today.

2 Empirical research

Empirical data was collected in order to obtain a better understanding of;

- what industrial designers '*want*' and '*need*' from a tool
- '*how*' the content should be presented
- '*what*' 'information' industrial designers need to be given to aid ecodesign (from Environmental Affairs and Industrial Design)

Data was drawn from a variety of different sources including; a survey of the company's literature, to identify their current level of understanding and practice in ecodesign; in-depth interviews and observational activities with Electrolux designers; interviews with design consultants not yet involved in ecodesign projects; a benchmarking study; a survey of creativity literature; and interviews with ecodesign experts.

The findings were analysed using a clustering methodology, which generated four themes relevant to the development of an appropriate ecodesign tool for industrial designers;

- *content* - (the type of content the designers required to be communicated through the 'tool')
- *style* - (the visual approach used to communicate the content e.g. tabulated, written, 2D imagery)
- *time* - (available/ required to use the 'tool')
- *format* - (the overall approach used to present the content e.g. book, booklet, workshop, web site)

The researcher's understanding of the themes was refined during the development and testing of the pilot study.

For more detailed information regarding the findings that were identified, please refer to (Lofthouse and Bhamra, 2001). This paper will summarise the main findings relating to each of the four themes.

3 Findings

3.1 Content

The findings from this exploratory stage indicate that industrial designers have two quite different types of 'need' when it comes to considering ecodesign, sometimes they need for inspiration and at other times they want information. The issues will be dealt with in turn.

3.1.1 Inspiration

During the Benchmarking project (Lofthouse and Bhamra, 2000) the Electrolux design team continually asked for examples of ecodesign, to help them ‘see’ what others were achieving through ecodesign. The designers wanted inspiration and stimulus, examples that showed what was possible and how others are ‘doing’ ecodesign (see Figure 3). These examples seemed to boost designers’ confidence by illustrating the different ways that design teams have tackled ecodesign challenges. When they were shown to other designers, they seemed to help broaden their understanding of the types of issues which can be considered under the banner of ecodesign.

The request for examples and images is typical of the way many industrial designers work, collating and using ‘mood-boards’, folders and scrapbooks of images, materials and ideas, to provide stimulus for their work. Providing ecodesign examples as inspiration or ‘food for thought’ for designers has been demonstrated through books such as MacKenzie’s ‘Green Design’ (1991) and web sites such as O2 (2000) which show how ‘green’ design can be ‘sexy’ and intelligent.

Main findings

Examples of Inspiration



EPSRC

Electrolux

Cranfield
UNIVERSITY

Figure 3 Example of ecodesign images used to inspire industrial designers

3.1.2 Information

In contrast to the need for inspiration, every group of designers interviewed expressed a need for specific information to help them become more easily involved in ecodesign projects;

“What I want is information on materials, construction techniques, recycling, and recycled parts...”

“...[we need information on] materials, legislation, general advice, general guidelines”

This has also been recognised by other researchers (Dewberry, 1996). However, the data also indicate that it is important for the information to be appropriate to the sorts of questions that industrial designers' ask. Although Electrolux's Environmental Affairs department clearly has a lot of internal environmental data, interviews with designers show that they do not use it.

"Yes, yes, (the information is) on the internal Intranet, in Lotus notes... it just doesn't really connect to what we do here, or how designers work... the Hazardous materials database is more useful to Design Engineering and to Production Designers, to those who are choosing and specifying materials." (Sherwin, 2000)

Where as Environmental Affairs seem to provide very specific, detailed information it seems that what is needed is information that is,

"...really general and broad... relative data, not specifics, so how good is this plastic, compared with this plastic?... then a bit more detail, like, what happens if its contaminated... then... the characteristics of these materials, so the designer can quickly see whether they can use them or not..."

One Electrolux designer suggested that what was needed was,

"...a sort of interpreter between Industrial design and Environmental affairs, translating their information into a format that is suitable for us..."

To summarise it appears that the designers need information, which gives them the "nuts and bolts" that they require to be able to actually get on with designing ecodesign products. They appear to want broad, non-specific data that they can easily relate to their work and which is relevant to the sorts of questions that they ask. They also want the information presented in a style that they can understand, that speaks their language.

3.2 Style

The empirical work clearly identified the importance of ensuring that the style of presentation used in the tool is appropriate for ID. Although the benchmarking project (Lofthouse and Bhamra, 2000) was instigated by the ID department, it soon became clear that if there was any chance of designers looking at the information collected, it needed to be visually appealing. Industrial designers are used to communicating through sensual language and highly visual means.

"...[designers] use pictures as stimulus for projects... They are interested in innovations and things..." (Sherwin, 2000)

A written document, and bullet pointed list both failed to meet requirements, where a PowerPoint presentation succeeded. It soon became clear that the normal method of communication within Electrolux ID was through PowerPoint presentations with maximum use of graphics and minimal text, illustrating creative snap shots of scenarios and ideas. PowerPoint also supports the designers' need for, "...nuggets of information!" something which were constantly demanded by the Environmental Design Manager. Discussions with him quickly identified the style in which he wanted information to be presented. He wanted bite-sized pieces of information that he could choose to digest, or spit out, 'snap-shots' of information which could be very quickly retrieved when required.

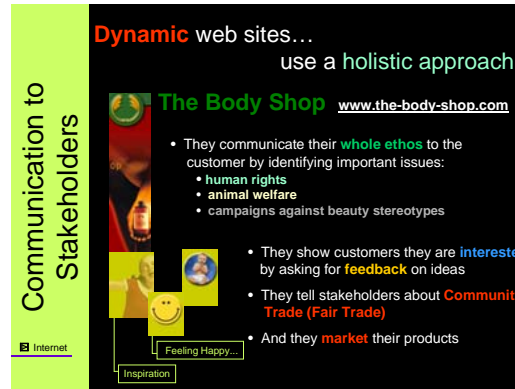


Figure 3 Example of the slides produced during the Benchmarking project

So the designers' reaction when Environmental Affairs tried to give them the company's Life cycle analysis results is not really surprising,

"...unfortunately it was just not successful, our designer fall asleep within 20 minutes. I mean he puts up a lifecycle matrix, with lots of figures and numbers on it... and they are away! (asleep)." (Sherwin, 2000)

The final set of presentations for the benchmarking project combined images and nuggets of information in a highly visual PowerPoint presentation (see figure 3). This approach was well received and was considered to be a success as the Environmental Design Manager went on to use a lot of the 'nuggets' and images in an internal initiative called SEEDS (Thompson, 1999).

3.3 Time

On numerous occasions designers referred to the time restrictions which are imposed on their design projects. A Senior Concept Designer's explained,

"The projects that I work on have really short timescales... maybe a week, often we have just 2 days to come up with the design... if I have a project which needs to be a green hero – with these considerations – I need to know how I can meet the brief in the couple of days... I haven't got time for anything academic..."

These types of time restrictions naturally limit the choice of appropriate tools. For example, many existing ecodesign tools (Brezet and van Hemel, 1997; Ñ Oudakker, 1998) use a workshop format as this provides time for hands on practice, or 'learning by doing', one of the best methods to ensure understanding. However, when a proposal similar in nature to the Promise Approach, developed at Delft (Brezet and van Hemel, 1997) was put to Electrolux ID, it was turned down. They considered it to be too time consuming and could not see the benefits in taking designers out of the studio to develop ideas. They also felt this approach was impractical because it required input from a number of different departments which was not something the designers felt they had the influence to implement, even if they wanted to. So although using workshops can be very successful at a more strategic level it does not seem to be compatible with the time scales imposed on industrial design.

A vastly condensed workshop focusing solely on the Industrial Design elements of ecodesign was also dismissed as being too time consuming. The reason for this appears to be related to the dynamic nature of design projects. Once designers are given a project, they start working straight away, drawing on the tacit knowledge they already have, moving from stage to stage pretty quickly. As such it is impractical to organise workshops because it is not possible to predict when the design team will be at the appropriate stage for a formal workshop. In effect, the designers seem to run their own informal, mini workshops in their heads whenever they start a design project, this is what is commonly known as the design process.

In summary it appears that designers want a 'tool' which will compliment their dynamic way of working and fit into their daily design practice. In other words they want something they can refer to as and when they need it, but which doesn't take up time or space when its not needed.

3.4 Format

The format of the tool refers to the overall approach through which the content is to be communicated, it could be a, book, booklet, workshop or web site etc. Once again appropriateness is a key issue here. A common approach has been to give designers little booklets of ecodesign checklists. In fact one group of Electrolux designers specifically asked for an ecodesign checklist, however as was not neither visually stimulating nor engaging, and had a reflective nature, it was not well received.

"We have plenty of checklists... But they are of no use! We need things for the beginning of the design process, not things for after, to do things reflectively. We need to consider this stuff at the start of designing rather than after we've designed the thing!" (Sherwin, 2000)

Another popular group of ecodesign tools, are Environmental Strategy Tools, developed "to identify and evaluate improvement options for design..." (Simon, Evans et al., 1998). However these types of tools are not really design tools as they do not show industrial designers how to 'do' ecodesign, instead they are focusing tools which help to direct the designers work. Observations have shown that using these incorrectly means that designers are confronted with questions which weren't relevant to their expertise (e.g. regarding the 'extraction of materials') which leaves them confused and demotivated.

As with the style, the format of the 'tool' should be complimentary to the designers' way of working, so that they enjoy using it. It has already been identified that although a hands-on workshop might appear to be the most appropriate approach for designers, time restrictions mean that it is not appropriate for Electrolux designers. A logical format for the tool would be a PowerPoint presentation, as it has already been seen that the designers respond well to this type of approach, and it is regularly used within IPDP. When the Environmental Design Manager put SEEDS (Thompson, 1999) together he was in effect developing a small ecodesign tool. As a designer he was creating what he felt designers' needed, a PowerPoint presentation containing ecodesign examples and URL links to interesting companies.

The discussion with the Electrolux industrial designers also identified that it is important not to overload information. Section 3.2 explained that designers want ‘nuggets of information’ most of the time, however it is important that they should be able to access more detailed information when necessary. The requirement indicates that a tiered system for providing information is needed.

These observations again reaffirm that designers want and need a ‘tool’ they can dip into as required and again demonstrates again their desire for ‘nuggets’ of information which can be explored further (by following web links) if required. A web-site providing visual stimulus and ‘nuggets’ of information in a similar style to that used in PowerPoint, with links to different sites, would however provide the capacity and the navigation power that PowerPoint could not compete with.

4 The resulting tool

The resulting prototype tool – ‘Information/Inspiration’ took a web based format. It combines information and examples and is highly visual. It was developed using the criteria or ‘rules’ identified during the empirical research and the pilot study in order to try and develop a tool which would be appropriate to industrial designers. The criteria are summarised in Table 1 below.

CONTENT	<ul style="list-style-type: none"> • Stimulating examples to inspire • Appropriate information which is relevant to their expertise • Someway of translating Environmental Affairs’ knowledge into the designers’ language
STYLE	<ul style="list-style-type: none"> • Highly visual and interesting • Combine images and ‘nuggets’ of information • Avoid wordy and technical explanations
TIME	<ul style="list-style-type: none"> • Fit short time scale • Compliment dynamic way of working • Fit into daily practice as and when it is needed
FORMAT	<ul style="list-style-type: none"> • Dynamic, and interactive • To allow designers to ‘dip’ into it when needed • PowerPoint / Web based • Levels of information

Table 1 Summary of main criteria for ecodesign ‘tool’ for industrial designers as identified from data sources

The website consisted of two parts – Information and Inspiration, allowing the designers to select the most appropriate route for the project they were working on. Within each of the two parts, information was presented using a tiered system, so that the designers could choose to either select simple nuggets of information, or delve further into issues of interest. This is illustrated in Figure 4.

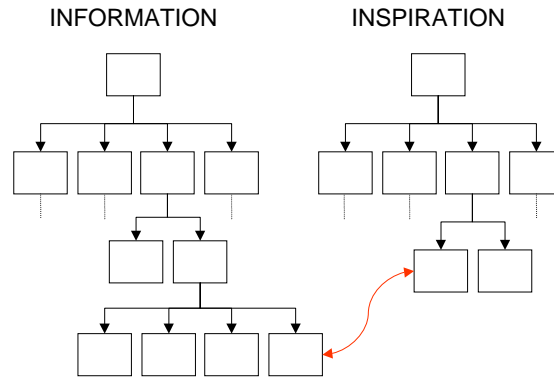


Figure 4 Illustration of the tiered information system used for the prototype tool

A simple but stylish approach was chosen for the web site, in order to avoid long download times and because of the time restrictions of the project. Figure 5 illustrates a number of developmental pages from the Inspiration part of the website tool. Figure 5A shows the Inspiration 'Home' page, which provides 6 categories; materials, form, energy, function, parts and packaging for the user to choose from. Each category is illustrated with an image which is 'clicked' to enter into that part of the website.

Figure 5B shows the 'Energy' category home page that is linked to the page in Figure 5A. The image from the first page is placed in the top left hand corner to ensure visual continuity and to help the user with navigation. On this energy page 5 sub-categories are available for selection;

- Energy saving
- Educating the User
- Human Powered Products
- Alternate Energy Sources
- Solar powered products

Each sub-category is also accessible through the side menu.

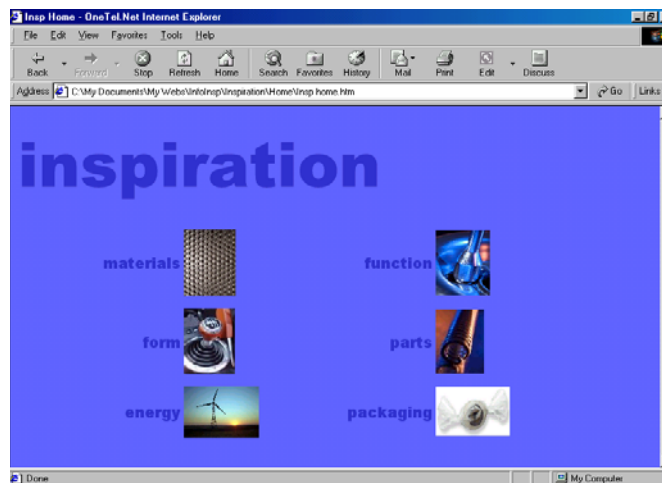


Figure 5A



Figure 5B

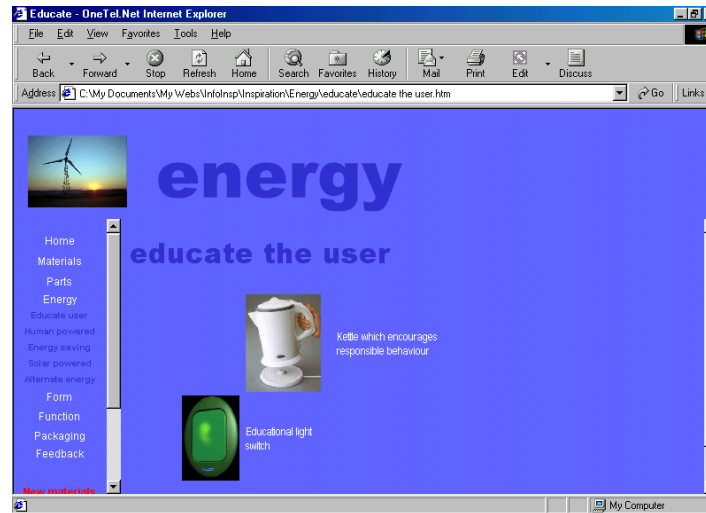


Figure 5C

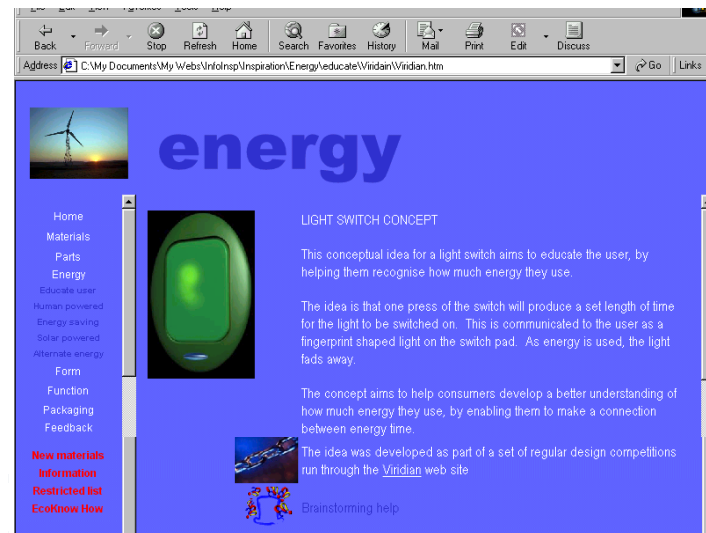


Figure 5D

Figure 5 Screen Dumps from the prototype 'Information/Inspiration' website

Following the 'Educating the User' strand takes the web user to another menu, where a selection of examples are available (Figure 5C). Clicking on the green images takes the user to a clear image and a concise description of the product. The product in the example, is a concept for a light switch. The idea here is that one press of the switch will produce a specified illumination time. As the illumination time is used up the imprint of the fingerprint fades, until it disappears and the light switches off.

By clicking on the 'links' logo the user can move to other associated web pages. Clicking on the 'hat' logo takes them to another web page which provides them with brainstorming help.

5 Conclusions

The prototype is still in its final stages of development. On completion it will be tested on the collaborating company, Electrolux and feedback will be obtained through interviews and observations. This feedback will be used to identify how successfully the 'rules', identified through the empirical study have enabled the development of an appropriate ecodesign tool which more accurately meets the requirements of industrial designers involved in ecodesign.

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