Cultural and Social Aspects of Sustainable Product Development,  
the research and demonstration program Eternally Yours

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Abstract:  
Aim of the interdisciplinary Eternally Yours program is to develop and demonstrate achievable, acceptable and attractive strategies for designers, companies and governments to provide products and services for sustainable lifestyles. The program is a societal and cultural approach to sustainable product development, triggered by the observation that in the developed countries more and more consumer products tend to be disposed of simply because people get fed up with them. Products are not allowed to age in a dignified way and cannot easily be repaired or upgraded. The program is carried out in close co-operation with companies, educational institutes and graduates.

Keywords: sustainable product development, cultural aspects

Introduction

Part of the environmental problem is due to the fact that commodities don't last as long as we would want them to. In environmental policies the life expectancy of products is in most cases defined only in a technical and economical sense. But in an increasing number of cases the psychological factor is of overriding importance: a lot of consumer products tend to be disposed of because people get bored with them, not because the product doesn't perform anymore. Consumers surround themselves with more and more products to which they feel less and less attached. A complex combination of minor disappointments - a scratch on the surface, a button that doesn't work, the feeling of technical backwardness, annoyance about daily use- practically makes them search for a reason to get rid of things. Products are not allowed to age in a dignified way and cannot be repaired easily or upgraded when new technological developments occur. Modern materials lack the ability to absorb time. These aspects depend on product as well as material design. The result is an enormous waste of raw materials and energy and the production of massive environmental degradation.

One of the reasons that prolongation of product lifespan has not gained much attention so far, is that it appears to be not in the interest of producers to decrease turnover by selling less products on the replacement market. Ways have to be found to compensate for this.

Although architects and toolmakers have been telling us for ages that the fruit of their work can change human behaviour (in the sense that better designed cities, houses, products, brings forward a better human being) and although in certain areas abundant proof exists that this is really the case (e.g. the automobile and the modern transportation system really changed the way in which humans interact) there seems to be hardly any structured, accessible and useful knowledge on the relationship between products, human behaviour and sustainability. The research and demonstration program Eternally Yours is meant to change just that. The program is in essence a societal or cultural approach, parallel to cleaner production and to ecodesign, which have both a much stronger technological dimension ("technological
fix”), aimed at sustainable product development. Societal processes, economic activities and institutional and policy aspects will be assessed in an integrated manner, based on several case studies in the form of graduation and promotion projects and workshops.

In order to make possible strategies as concrete and applicable as possible, graduation projects are executed in collaboration with industrial partners (e.g. General Electric Plastics, Philips Corporate Design, Inter Ikea Systems). Several educational institutes participate: Faculty of Industrial Design Technical University Delft (NL), Academy for Industrial Design Eindhoven (NL), Erasmus Centre for Environmental Studies Rotterdam (NL), University Twente (NL) and presumably Domus Academy in Milano (IT). The official start of the Eternally Yours program took place on the 25th of April 1995. The program is intended to run for three years.

The Longevity Complex

Technically a product’s lifespan is determined by its ability to keep on functioning properly over time. The human psyche translates this aspect into the perception of reliability. An easily repairable product can afford more frequent repair to be perceived as just as reliable as one that needs a less frequent but time consuming maintenance intervention. Economically, lifespan depends on comparison of costs of repair, upgrading and maintenance with the costs of replacement. But costs of saying goodbye to the old and familiar and gain from welcoming the new and unknown are unquantifiable. Apart from the aforementioned technical and economical considerations, a products lifespan is determined psychologically by a complex dynamic composition of perceptions. If the harmony of all perceptions of a product is shattered by the negative value of one of them, the user/owner may do away with it. Disposition factors for discarding behaviour can be grouped into three categories [Jacoby et al, 1977]:

- Psychological characteristics of the decision maker, such as taste and mood
- Situational factors extrinsic to the product, such as finance, storage space, fashion changes, and whether the product is a gift or purchased
- Factors intrinsic to the product, such as age, size, style, quality, colour, energy consumption, features, adaptability, and dignity.

Now the different factors may be arranged in a grid:

<table>
<thead>
<tr>
<th>Technical lifespan</th>
<th>Situational factors</th>
<th>Psychological characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>reliability, durability</td>
<td>climate, use</td>
<td>character (caring vs. rude)</td>
</tr>
<tr>
<td>Economical lifespan</td>
<td>initial cost, cost of repair, upgradeability, innovation</td>
<td>economy, taxes, VAT, finance</td>
</tr>
<tr>
<td>Psychological lifespan</td>
<td>age, size, style, colour, features, adaptability, dignity</td>
<td>fashion changes, storage space</td>
</tr>
</tbody>
</table>

Table A: factors determining lifespan of products

The Eternally Yours project mainly deals with intrinsic product qualities that effect the psychological lifespan. But in manipulating product qualities the designer also seeks to influence the circumstances of product use and even the psychological characteristics of the individual consumer. Not only the core product or even the tangible product, but the total proposition, in marketers words, will have a strong influence on the way users/owners interact with their purchased products and with the way they eventually dispose of it.
Longevity characteristics

‘When the material gets tired, the building wakes up’, says German architect Christian Möller. Among designers and architects there is a general feeling of nostalgia for better times, when objects were still allowed to age. The industrial development however, has saddled us with the paradigm that we produce things to change them, to pursue a different feeling of well-being and a better future. And not just once, but over and over again. According to this system of beliefs, the diffusion of large numbers of new products is synonymous with progress. In the view of Ezio Manzini, director of the Design department of Domus Academy, this concept is no longer valid: ‘It is time for a new generation of products, that can age slowly and in a dignified way, that can become our partners in life and support our memories. Never before has this been a goal in itself.’

Semantics

In semantic design theory objects are said to have a primary and a secondary function. The first deals with what it does, technically. Thus a car is a means of transportation, a steam iron diminishes the number of creases in shirts and clothes in their turn protect our bodies.

The secondary function is much more complicated. It entails the entire web of meanings that can be attached to products, from the down to earth ones, like which button to press or how to open a lid, through subjective values like beauty, all the way up to cultural cues that deal with symbols of status and fashion [Mick, 1986].

Especially the latter aspect of meaning has been an important industrial instrument for speeding up the flow of new products to the point that our living environment has become virtually volatile. More and more products reconcile themselves to the laws of fashion. We live in a material world. However, materialism and its subtraits - envy, nongenerosity and possessiveness - seems to be negatively correlated with happiness in life (‘happiness is the next purchase away’) and seems to be less for older generations [Belk, 1985].

Ecology

Theorists have tried to tie in the product development cycle with ecology according to Gregory Bateson’s broad definition: ‘a study for survival of ideas and programmes in cycles’. Manzini says the designer should do his job with respect for nature. The assumption that product development must be compatible with ecology has led to the conclusion that the entire product lifecycle must have minimum impact on the earth’s resources. One of the logical consequences: the larger a product’s impact on the environment during production and after its discarding, the longer its required longevity. Information theorist Klaus Krippendorff [1989] links the ecological context with product semantics: ‘If artefacts are to carry their own history into the future, they must be equipped with the semantics to do so’. And: ‘From the point of view of a responsible product semantics, inventing and pursuing symbolic strategies that slow down the inevitable processes of decay are important’. He directs our attention towards language, which can be considered an extremely important medium to develop new criteria to judge the ageing-with-dignity quality of products and materials.

Technical criteria

Some of these criteria have already been identified and seem to have a down to earth technical character:

- Adaptability: users should be able to adapt their products to their changing demands.
- Upgradeability: users should be able to upgrade their products and add new features when technological development allows for functional improvement.
- Reparability: products should easily be repaired, either by the producer or the consumer. In fact however this needs to be expressed in design. If for instance a user cannot tell what’s wrong with his stereo if it doesn’t work, reparability remains a monodimensional enigma. Most of our equipment starts talking gibberish, if it expresses anything at all, as soon as its doesn’t function properly anymore.
This provides us with a co-ordinating aesthetic criterion:

- Clarity: the understandable expression of function, including upgradeability and the other criteria mentioned above.

**Surface criteria**

Part of a product's dignity is derived from its surface. In the catalogue for the 18th Triennale in Milan Manzini states: 'Efforts should be made to develop research into materials and surface treatments that last over time and that allow maintenance and upkeep.'

So far materials and surface treatments alike always only had to satisfy purely technical requirements: strength, stiffness, heat resistance, electrical conductivity, moldability, and so on and so forth. Now it is time to define new ones, like:

- stamina (ability to regain dignity after repair)
- repaintability
- polishability
- soundness (ability to make an impression of reliability)
- musicality (the ability to produce pleasant sounds when used) etceteras

Classic materials like steel and wood possess all these qualities, while plastics fail in some of them. Also the classic surface treatments (painting, waxing, ..) allow for repair and upkeep, while for instance anodization of aluminium doesn't.

**Identity criteria**

The aforementioned criteria for surface quality, also apply to the complete product. The dignity of its total appearance however is more difficult to grasp. One way to come to terms with this aspect is the use of abstract qualities. In the end it is not all that unusual to call a product strong or weak, honest or shifty, lasting or ephemeral.

A classic design instrument, called the semantic differential (as proposed by Osgood) can map the overall aesthetic quality of a product, and to measure its change in time: a panel of people is requested to judge a product on opposing qualities, for instance warmth and coldness. The mean values of their respective judgements is considered to provide an objective description. Furthermore we can consider a commodities capability to absorb history (which also applies to the materials they consist of). An interesting help to formalise this concept was proposed at the O2 event Sustainable Lifestyles in November 1993 in Rotterdam. Products and their parts could be recorded in pedigrees. Objects are worth more when there's history attached to them.

Thus the co-ordinating identity criterion may be:

- character (personality)

**Present Consumption**

To establish the product categories to which development of new longevity properties is meaningful, we present an overview of consumption and reasons for disposal. In the Netherlands an average household spends about Dfl. 40.000,-- a year on all its needs [Muis, 1994].

![Figure A: money spend on different consumption categories (in Dfl.)](image-url)
It uses less than half of this amount (Dfl. 16.540,--) on hard products, the rest is for services, rent, insurance and energy.

Figure B: money spend on products (in Dfl.)

**Durables**

The concept of longevity is only relevant for durable consumer goods, and does not apply to food, drinks, cleaning agents, detergents, body care products and cosmetics and medicine. Looking only at the Dfl.7500,-- that households spend yearly on durables, it becomes clear that Dutch people turn the major part of this money into clothing and cars. In this overview audio-visual equipment includes personal computers and telecommunication devices.

Figure C: money spend on different products (in Dfl.)

**Disposal**

First we present a graph showing the market penetration of different kinds of (electrical) appliances [Meiling etal, 1993]. It provides us with an indication which commodity categories have entered the stage of being merely replacement purchases.
The next picture presents an overview of reasons for disposing certain products [Blonk, 1993].

Most of the equipment is bought new. In general there are several reasons why products which are still functioning will be disposed off:

- receiving a replacement as a gift
- new product has more features
• old product didn’t fit in with changing environment (wrong style, colour, ...)
• old product no longer corresponds with one’s preferences or self-image
People get rid of drilling machines, vacuum cleaners and washing machines because they don’t function anymore and when they are too expensive to repair.
On the other hand stereo’s are disposed of in most cases (60 - 90 %) because one wants more functionality. Stoves are replaced when the kitchen is being refurbished (75%). Telephones and computers are replaced because of a need for technical upgrading.

Categories of products

The next table provides a tentative classification of the reasons for discarding products.

<table>
<thead>
<tr>
<th>product</th>
<th>Dfl. per year</th>
<th>broken, not repairable</th>
<th>out of date, not economically upgradable</th>
<th>doesn’t fit in new environment</th>
<th>doesn’t correspond with new preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>lighting</td>
<td>79</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>jewellery</td>
<td>94</td>
<td></td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>toys</td>
<td>114</td>
<td>+</td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>spectacles</td>
<td>130</td>
<td>+</td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kitchen utensils</td>
<td>134</td>
<td>++</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>linenware</td>
<td>160</td>
<td></td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>bicycle</td>
<td>185</td>
<td>+</td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>elec. appliances</td>
<td>340</td>
<td>++</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>int. decoration</td>
<td>398</td>
<td></td>
<td>++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>furniture</td>
<td>415</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>shoes</td>
<td>467</td>
<td>+</td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>audio/video</td>
<td>610</td>
<td></td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>books etc.</td>
<td>798</td>
<td></td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>car</td>
<td>1674</td>
<td>++</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clothing</td>
<td>2056</td>
<td></td>
<td></td>
<td>++</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: reasons for discarding products (tentative)

Selection

The criteria specified before can be used to try and improve products of most of the above mentioned categories:

• Lighting and jewellery are not worthwhile considering, they do not represent a lot of material turnover.
• Toys are the first across the Dfl. 100,– borderline. Their sold quantity tends to grow quickly. Some big American companies are working hard to get a grip on the European market. Also toys tend to be affected by crazes usually followed by boredom. They are a token of good relationship between givers ((grand)parents) and receivers. Some existing toys fit the aforementioned criteria to a certain extent (LEGO for one). A lot may be gained if more toymakers would produce within a similar philosophy.
• Spectacles certainly are a fashion product these days. But like jewellery they don’t represent an interesting mass of material.

• Kitchen utensils tend to be used until they’re totally worn off. Also they do not represent that much material.

• Linenware is no problem as far as aesthetic degradation is concerned. An old sheet simply turns into pieces of cloth to be used for upgrading the surface of cars and bicycles.

• Bicycles have become a fashion article to a certain extent. They are however rather stolen than disposed off. They are in use right until the bitter end.

• Electrical appliances can be divided in several categories. White goods often stay in the household too long. They are still getting more efficient, to the point that it would be better for the environment to discard them earlier than they are now. A more modular approach seems appropriate. Small household appliances however seem to be very much in need of quality improvement. Their surface quality is low, and reparability or upgradeability are virtually non existent, apart from the replacement of the odd vacuum cleaner hose.

• Interior decoration provides us with a very interesting range of surface covering products. Here we have a chance of material improvement for everything from floor covering to wallpaper and paint. Plastic floor covering materials wear off easily. If one moves a table, it leaves unrepairable dents and scratches. Keeping it clean over time is difficult.

• Furniture has become a fashion product over the last ten or fifteen years, which makes it worthwhile looking into. Especially furniture suffers from the myth of timelessness. A design classic is not necessarily a product that can last forever. Nostalgic reverence is not what we’re after. A strong identity is.

• Shoes are typical fashion products, a means to express ones identity. The search for methods to provide this function in an ecologically responsible way presents an interesting challenge.

• Audio-visual equipment (and computers and telecommunication equipment) develop very fast. Upgradeability, reparability and clarity are key characteristics in its improvement. Furthermore they lack identity.

• Books, magazines and newspapers mainly consist of software and are slowly beginning to dematerialise into electronic media. The longevity of books is no real problem, while newspapers and magazines are short lived by nature.

• Although cars are disposed of rather quickly by the first owner, there exists a large second hand market and almost every car is in use until the technical life expectancy is reached (10 - 12 years).

• For clothing the same considerations apply as for shoes. The immense amount of money spent makes it an important category.

• The list does not contain construction materials. They can however be considered a separate category covering all the other ones.

Strategies

The Eternally Yours program seeks strategies that will increase the satisfaction of consumers while at the same time being much more benign for the environment and profitable from a business point of view. Most strategies will involve a shift from materials to services and stress values like care, quietness, dignity, instead of physical properties like strength, speed, power.

Whatever strategy is chosen to slow down production of replacement products, it needs to contain ways to compensate for turnover loss. Two general directions are provision of services of which production is a part, and regionalisation combined with decentralisation – why should a Lithuanian TV-set be identical to a Korean one. The formalisation of a decentralised service economy needs a lot of exploration.

German designer Dieter Rams suggested that companies should forever remain owners of the commodities they produce. This however would be at the expense of a user’s feeling of responsibility for and attachment to his or her belongings. And that is in fact what we’re after.
Strategy development must be performed in a combined effort of producers, designers and government. Development of new products and services needs to interact with the formation of standards, regulations and law. One could for instance imagine a rule that the product guarantee period must be directly related to the amount of energy and (recycled) materials used to produce it. Strategies to stimulate the product's owner or user to keep it, maintain it in good shape or cherish it, are all determined by the criteria in chapter 2. The emphasis may differ according to the product category under consideration:

- **For toys** the strategy of adaptation according to the child's age is classic. Toy producers could start up a service to take back used toys to be repaired and provide new ones when a child gets older. A cleaning service may also be in order. The craze effect may be compensated by high quality standards and the pedigree concept (which seems to work for teddybears). Regionalization or production on a smaller scale may also improve the identity of toys.

- **Small household appliances** need improvement in reparability. The user should be able to mend the damaged casing and replace worn down parts easily, or the producer could provide a repair service. Service should be the selling argument, instead of features and glitter. The identity needs strengthening and change. There is plenty of room on the market for producers to stop imitating each other.

- **Interior decoration products** demand better reparability and some of them should be easier to clean. Absorption of history is an important issue here in the sense that for instance floor coverings should have more stamina.

- **What furniture** needs is a stronger and less trendy identity. This is also a question of material quality. Furniture producers in the Netherlands are currently trying to increase turnover by selling more products. Instead they should try to achieve more profitability by providing more and much better after sales service. Some furniture producers provide new coverings. This service could be extended into the direction of modular design (already existing in shelf systems) for tables and chairs. Taking back and upgrading used parts and a pedigree system may complete the service.

- **Clothing and shoes** express individuality. The use of yet to be developed regional materials could be a strategy to emphasise at least part of this. At the O2 event (November 1993) it was suggested that producers should change into being providers of a dressing service. Another strategy might be the development of very simple ways for people to compose their own garments, not by knitting and sewing, but for instance by taping and welding.

- **Consumer electronics** can become less enigmatic in many aspects, such as malfunction and upgradeability. Their casing almost totally lack identity. As the matter of fact miniaturisation of electronic parts is one of the causes of the current design crisis. Software could provide a solution by enabling the user to change the appearance of his or her equipment. A different idea might be to provide the client with a choice between a wide variety of sculptures which serve as casings for what is left of functioning parts.

- The strategy for improving **materials** was in fact described earlier: we need to develop new criteria by which we can judge ageing quality.

**Where are we now?**

Up till now Eternally Yours has posed a lot of questions and delivered little answers. This paper was based on a position paper commissioned by the Dutch Design Institute in 1994. In April 1995 the program has officially started and in September 1995 already 7 graduate projects are underway with students working on a variety of themes ranging from leasing furniture, ageing with dignity, take-back scenario’s for IKEA, to repair & upgrading strategies for Philips consumer electronics. In November 1995 a workshop on the Eternally Yours theme will be organised for Doors of Perception 3: Info-Eco, produced by the Dutch Design Institute. Ultimo 1996 a symposium will be organised and a publication issued on the Eternally Yours theme, both made possible by a grant of Stichting Ikea Foundation from Amsterdam. During 1996 and 1997 projects within companies will be initiated.
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