Following the path from sustainable consumption to ECODESIGN in companies – experiences made so far.

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Introduction

More than two years ago a multinational company producing office furniture asked for an appropriate tool to integrate ECODESIGN into their product development process. A company adaptation of the ECODESIGN **P**roduct **I**nvestigation, **L**earning and **O**ptimization **T**ool (PILOT) [1] has been carried out and this initiated a continuous improvement process within that company. Today the former tool is well established and just one out of a whole set of elements supporting different functions involved in product development. Within a partnership of the company, the Vienna University of Technology and the Technical University of Denmark the integration of environmental thinking is aimed at. This paper describes experiences made so far in this ongoing process and points out mayor steps for integrating environment into the company's products and activities.

Objective

The idea was to support a company willing to work on the sustainability idea with environmental knowledge and to put the conveyed knowledge into every-day practice in a multi-national enterprise, involving the whole related supply chain and rise awareness among the customers.

Method

In a first step the development of a tailor-made solution of the ECODESIGN PILOT was done, then a tool for material selection was built up to show "how to improve" products and to support design and R&D departments in decision making. The issue of "communicate what you did" was addressed by performing an Environmental Product Declaration [2]. Therefore it was necessary to "analyse" in detail the environmental performance of the products. This was done with Life Cycle Assessment (LCA) [3]. All these activities require a deep understanding about the environmental problems we are facing today and about possible solutions. This has been tackled with the installation of an e-learning platform to "educate" not only engineers in product development but also related functions in the company like marketing, purchasing, production among others. Figure 1 shows the elements of this continuous improvement process.
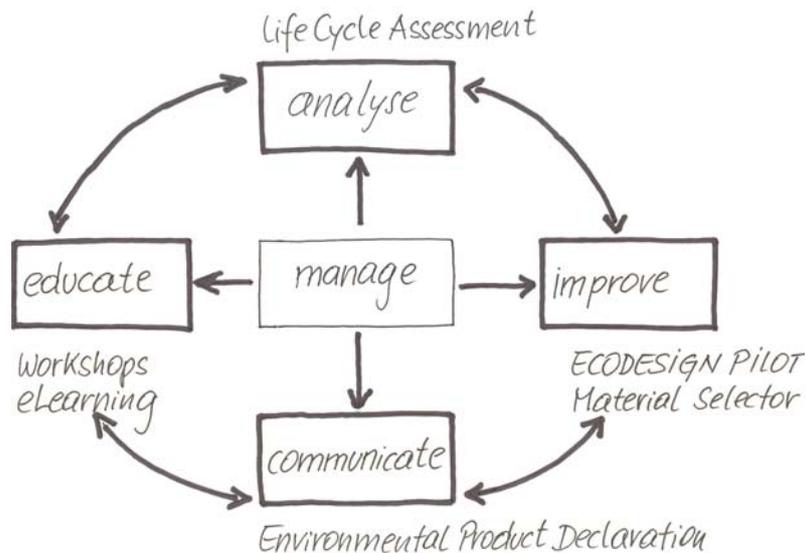
Figure 1 Elements of the continuous improvement process

All activities have strong support from the top management of the company and are adopted openly by employees. Their response and feed-back is integrated as a corner stone in the described continuous improvement process.

Results

The result described here is a real-life example of implementing environmental considerations into the product development of a large company by supplying tools for decision-making, by providing training on the new issues with an e-learning platform and by communicating to the customers what has been achieved through an Environmental Product Declaration (EPD).

Analyse - Life Cycle Assessment

It was decided to perform a LCA according to ISO 14040 to identify relevant impact categories, such as *Global Warming* or *Ozone Depletion*. This was done to gain insight into the environmental performance of the product, but also to find out products contributions to selected environmental impact categories. These contributions are needed in the EPD according to ISO TR 14025. In this type of declaration LCA is a main element to express the environmental impact categories in the relevant equivalents e.g. Global Warming Potential in kg CO_2-equivalents. For the particular EPDs carried out, the equivalents were quantified for all stages of the product life cycle following the suggested format in [4].

Improve - ECODESIGN tools

The ECODESIGN PILOT was developed as a tool for environmental conscious product development, offering a learning approach to rise the awareness for ECODESIGN and a qualitative design assessment procedure with checklists to identify possible product improvements. This tool is available on CD-ROM and in the Internet (see: www.ecodesign.at/pilot). Originally it has been designed as a generic tool, since requirements of companies are often very specific, tailor-made software solutions can be developed based on the PILOT.

An adaptation focuses on product- and company-specific requirements and was done for the manufacturer for office furniture. The ECODESIGN – FURNITURE – PILOT was created. The adaptation comprises product specific ECODESIGN guidelines as well as company specific design procedures. In a first step all ECODESIGN guidelines for office furniture were collected and described with text and pictures. These guidelines were then used to advise for each stage in product development the relevant ECODESIGN guidelines for office furniture. The idea was to give support in "doing the right things at the right time" during the development of new products. Additionally the tool was extended by strategies applicable for improving existing products within the Life Cycle Management process of the company (see Figure 2).

Figure 2 The ECODESIGN FURNITURE PILOT

In addition the Material Selection Tool (MST) was developed. The aim was to create an easy to use tool, that enables a designer to choose the environmentally preferable alternative out of different materials. Based on specified aspects concerning *environment*, *function*, *surface* and *shape* a designer gets a pre-selected list of possible materials to choose from. The material database which the tool uses, contains all aspects and categories of material data which are relevant for product developer. A "filtering" method, where minimum requirements of different criteria are defined, points out those materials, which are matching these requirements. For the final decision the product developer can compare the detailed data sheets of the different materials and suppliers. Figure 3 shows the request form of the MST.

Figure 3 Request form of the Material Selection Tool

Communicate - Environmental Product Declaration

With the EPD according to ISO TR 14025 an instrument for business-to-business communication was found. Figure 4 shows the information given in the EPD. Finding the final format for the EPD was accomplished by collaborating in a cross-functional team with members from product development, R&D, production but especially purchasing, communication, marketing, logistics and sales.

Figure 4 Elements of the Environmental Product Declaration

As the product is sold on various global markets, the descriptions and product properties had to relate to requirements on the different markets, including also relevant environmental labels such as the French "NF-environnement", the German "Blauer Engel" and the Japanese "EcoMark".

In order to provide appropriate facts for other types of customers such as end customer (buyer), a product sticker is currently under discussion. This could be the most simplified version of an EPD naming important environmental aspects of a certain product range (e.g. office chairs).

The implementation of these forms of communicating environmental information could support the continuous improvement process by delivering clear improvement targets as well as influence the purchasing decisions of the customers.

The preparation of the EPD within a cross-functional working process lead to a better understanding of environmental issues and opportunities to address these issues in the different departments throughout the company.

Educate – e-learning course

In order to train staff, an e-learning platform was chosen as a company-wide means to distribute knowledge. For the first course three lessons were developed to reflect and understand the *continuous improvement process* and get advice on how to achieve product related improvements. Every lesson has a theory part for enhancing the environmental knowledge (e.g. Life Cycle Thinking) and a part where the user can actually learn the application of the different environmental tools and instruments. The three lessons are related to the above described elements and are based on illustrative product examples:

- Lesson 1 – ECODESIGN FURNITURE PILOT
- Lesson 2 – Material Selector
- Lesson 3 – Environmental Product Declaration

To enhance the acceptance of the e-learning course different media such as video has been integrated (see Figure 5).
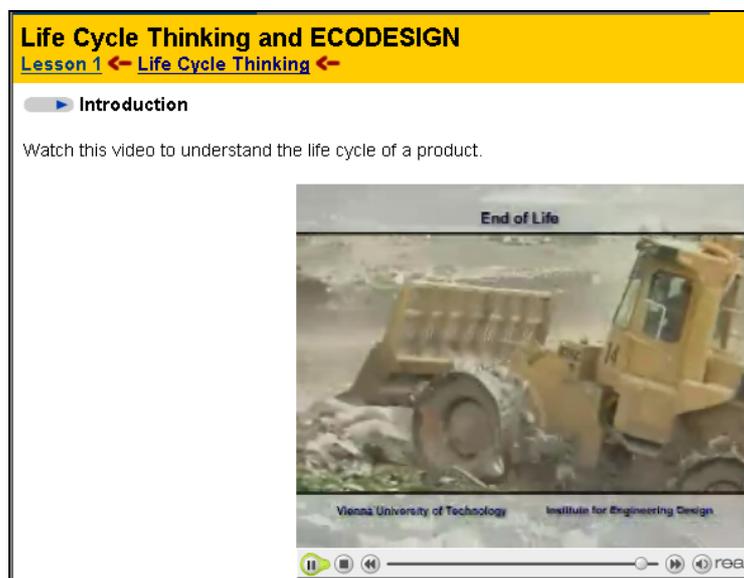

Figure 5 Example of an e-learning lessons

Summary

Judging from the positive experiences already made with improving the environmental performance of products and with enhancing the environmental awareness of individuals, the continuous improvement is a learning process that has excellent preconditions to go on in the future with the support of all participants.

In that way, an ongoing *continuous improvement process* has been started in the company where the different departments – all the way from marketing, design, purchasing to manufacturing and logistics – are integrating environmental thinking in their designated area in order to achieve better products.

The initiative started within the company has consequences going beyond the company itself since supplier and customer are involved. The environmental ideas are spread out through that. On supplier side to enhance the understanding "what to deliver" and on customer side to rise awareness on "what to buy". Buy that the whole value chain is addressed and pushed towards sustainable consumption.

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