Communication of Semantic Properties

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Abstract:

The selection of materials and planning for production play a key role for the design of physical products. Product function, appearance and expression are influenced by the chosen materials and how they are shaped. However these properties are not carried by the material itself, but by the specific way that the materials are used in the product. Selection of materials is therefore often done by looking at similar products. The product as well as its constitutive materials possesses a number of technical properties like strength, stiffness and hardness. Furthermore the product possesses a number of semantic properties associated with the meaning we read from the form, colour, texture and sound of the product. The purpose of working with these properties can be to make the use of the product more self-evident, to form or enhance the cultural meaning of the product and to give the product a distinct character. For the technical properties there exists a well developed and commonly accepted terminology that can be utilised at product search and material selection (Ashby 1996). This is not the case for the semantic properties which are important for the outcome reflecting the product design processes.

This working paper argues for the need for a commonly accepted terminology used to communicate semantic product properties. Designers and others involved in design processes are dependent of a sharp and clear verbal communication. Search facilities in computer programs for product and material search also require a clear terminology. It is not our aim to identify a new terminology but rather to identify the terminology already in use. The paper also describes different research methods for identifying such a terminology.

Background

Products are to a growing extend being sold based on soft values such as aesthetic design and styling and the image they give the owner. This makes it more important that people involved in product design and development can communicate these softer or more intangible values. Work within this area is pursued a number of places. (Lopez 2003) have developed an acoustic measurement technique that makes it possible for non-experts to evaluate product sound. The technique is used for evaluating sounds from lid-closing and button-pressing on mobile phones. (Warrell 2001) have developed a theoretical framework he calls ”design syntactics”. It links the aesthetic shape of products with functional reasoning. The framework includes terms like form functionality, shape syntactics and design formats. He also describes how it is possible to identify the important shape elements which gives a product its characteristic expression (for example the recognition

of a brand). (Vihma 1995) describes how aesthetic appreciation can be related to semantic and semiotic analysis. Four types of products have been closer examined: Irons, fitness cycles, telephone boxes and bicyle helmets. (Goovers 2003) examines whether it is possible to build ”personality” into a product. 18 design students sketched irons that should be either ”happy”, ”cute” or ”tough”. An 88 person panel then ranked the sketches based on the three terms. The result was that the panel understood the design intention, even though the differences between ”cute” and ”happy” was less distinct. It is also described how the students could formulate which visual means they used to obtain a certain expression. (Pascalle 2000) has investigated how 12 persons describe 30 different watches using so called ”intangible attributes” (reminds of the first questionnaire in Lenau & Boelskifte 2004). She concludes that there is an agreement about the use of a number of the terms.

(Johnson et al. 2003) describes earlier research on identifying terminology for the semantic properties of products. They classify the properties into sensory attributes (input directly registered by our senses), perceived attributes (the interpretation of what is sensed) and stylistic attributes (placement in a period of style). An experiment with a cross disciplinary group of students (from industrial design, business administration and engineering) indicated consensus about which words described the sensed and perceived experiences for 6 selected products.

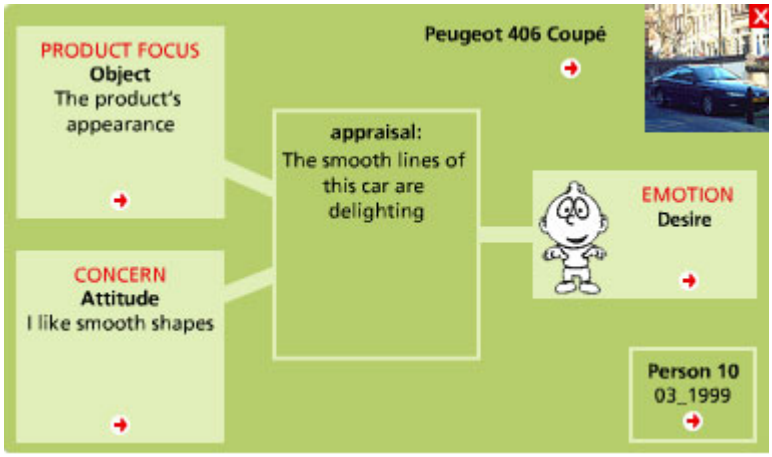

Figure 1. Explanation of a person's emotional reaction to a product (Desmet 2002)

(Desmet 2002) has studied how products evoke feelings and he has developed a framework where 14 categories of feelings (e.g. satisfaction, joy, contempt,…) are linked to views on the product (product focus) and expectations (concern). “Product focus” can either be an “event” (anticipated consequences, reminds of the semiotic index term, se below), an “agent” (the product as a personal image) or the object in itself. ”Concern” is about attitudes and preferences and reminds of the semiotic term ”code” (se below). The term “appraisal” (i.e. an explanation on how a certain product evokes a certain feeling) links “focus” and “concern” to the feelings given by the product. He has furthermore developed an elegant and comprehensive web-based database (Product & Emotion Navigator). Here 32 persons describe the feelings that different products give them. Every single product is documented with a picture and a description in accordance with the above mentioned dimensions of analysis. From the database it can be seen that there are

very large differences between how precise and articulated the persons are in the description of their “appraisal”. We see this as an indication for the need of awareness for the terminology we are in the process of identifying.

We have also encountered this need when searching for materials that add certain expressions to products, e.g. in the materials encyclopaedia www.designinsite.dk.

Aesthetics, communication, signs and meaning

The word “aesthetics” (in Danish: *Æ*stetik) is used differently by various philosophers (Zander Hagen 2002, Faurholdt 2000). Favrholdt describes a widespread attitude to aesthetics with a quotation from the philosopher Augustin: ’What is “time”? If nobody asks me, I know it. But if I should explain it to someone, I do not know’. In our work we see aesthetics as the value-loaded comprehension of our surroundings which can be created by human beings or being found in nature. Some aesthetic experiences are common to most people (for example “the golden proportion”) and others are taught (The Greenlenders affection to fermented puffins is not shared by many others; People from the island Alrø in Denmark prefer salt in the coffee, since the groundwater at Alrø is slightly salt; The colour of mourning is black in western countries but white in China). In our work we try to encircle terms that are generally understood in a similar way.

Since our research project deals with the communication of product and material properties, it is fruitful to place it in relation to communication theory. Here are 2 distinctly different schools: The process school and the semiotic school. In the process school communication is seen as the transmission of messages while the semiotic school sees communication as production and exchange of meanings (Fiske 1980 og Monö 1997). The process school is among others represented by Shannon and Weavers linear communication model, where a message is send from a sender to a receiver and possibly being disturbed on the way. The quality of the communication depends on how well the technical problems (precision), the semantic problems (meaning) and effectiveness problems (is the messages received) are solved.

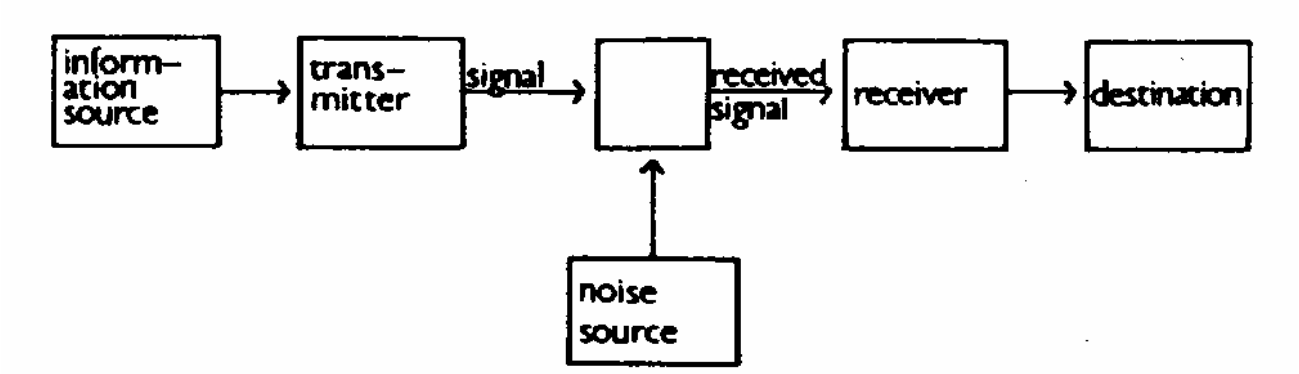

Figure 2. Linear communication model (Shanon and Weaver)

Within the semiotic school do signs and the understanding of the signs play a central role. (Monö 1997) describes semiotics as the study of signs and sign systems, their structure

(syntax), their properties (semantics) and role in a socio-cultural behaviour (pragmatics). The semiotic school is among others represented by the American philosopher and logician C.S.Peirce and the Swiss linguist F.de Saussure. Peirce talks about the described object, the sign (that describes the object) and the received (called the interpretant). The success of communication in particular depends on the meaning given by receiver to the signs. The signs are classified as either icons, index or symbols. The icon has a similarity to the object it refers to (e.g. a drawing of a woman on a toilet door), the index is directly connected to the object (e.g. smoke is an index for fire) while the symbol only is connected to the object because we have decided it (Letters and numbers are symbols while roman numbers are icons). Saussure is mainly concerned with the sign itself which he splits it into the physical appearance (the signifier) and its mental concept (the signified). To a lesser degree he also looks on the interpretation from the receiver (the signification).

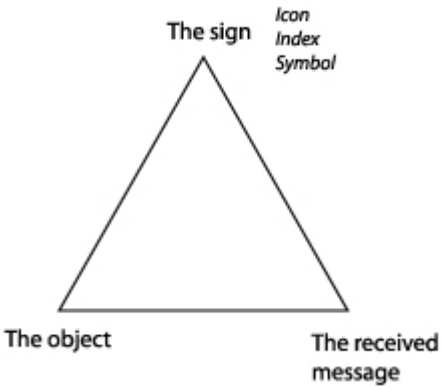

Figure 3. The object, the sign and the received message (after C.S.Peirce).

The word semantic can be defined as “the science of the meaning of words”. Our focus is on the verbal communication of product aesthetics and we use the term semantic properties to describe how we in words can describe the impressions that products give us.

In communication it is important that the message is understood in the same way by different receivers. The interpretation is based on a set of rules referred to as “codes”. The term origins from B. Bernsteins work with the language codes, that rules how children develop their language. The codes are a common comprehension of how signs can be interpreted. As an example we agree on the meaning of different traffic signs and light signals and that certain facial expressions signals kindness or refusal. The codes are either formally taught (e.g. traffic teaching) or more informally learned (in the bringing up of children and in the social contact between people).

We beleive that there exist commonly used (informal) codes for the interpretation of sensed and symbolic product attributes, and that our experiments will verify this.

A common terminology?

There are several reasons for us to work with this area. One is the need to strengthen the understanding and the terminology within aesthetics, semiotics and semantics. Our

starting point is our own students in Design & Innovation. It is not sufficient that people with an interest in industrial design has an internal language for these topics. A deliberate use of industrial design have an increased importance as a strategic business parameter (Dansk Design 2003), and it is therefore essential that industrial designers and others involved in design processes can communicate precisely and clearly on these topics. This is important in material and process selection, where the designer has the need for searching for existing products and solutions with desired properties (including the aesthetic, semiotic and semantic properties).

It is our hypothesis, that everyone in common daily language uses a number of aesthetic, semiotic and semantic terms. The question is how large a part of this assumed vocabulary that has a more general clear meaning. Our investigations will serve as a starting point to achieve this understanding.

There are a number of different methods to investigate this question e.g.

1. map the terminology used in literature
2. let experts formulate and criticise set of words
3. description of specific products using predefined set of words
4. description of specific products using own words
5. identifying products that match predefined words
6. identifying products that match predefined words (from a limited set of products)
7. sketching products characterized by certain predefined words
8. making mood boards to describe certain predefined words

(Johnson et al. 2003) used a combination of method 1, 2, 3 and 4. Terminology used to describe products in design magazines and museum catalogues were collected (method 1). The result was a substantial list that was classified into 3 groups: Sensory, perceived and stylistic attributes (method 2). Since the object in this literature is so called “designed products” the question is if the identified terminology is to narrow. To overcome this problem a group of test persons were asked to describe specific products in their own words (method 4). The question is how many different people it is necessary to ask to get a good picture. Method 3 was used to test if the words could be used to describe semantic qualities and if there were agreement on the meaning of the words. The difficulty here is that many products are needed in order to cover all the words. The described experiment had 6 products.

(Lenau & Boelskifte 2004) uses a combination of method 2, 3 and 5. The terminology lists suggested by (Johnson et al. 2003) were critically revised (method 2). The logical structure was examined and compared with the terminology, which is used in the teaching of industrial design. The sequence of sensory attributes was changed, so it now starts with visual attributes, followed by other attributes for feeling (tactile / haptile / kinestetic), smell, taste and hearing. Method 5 was used to examine if the words were meaningful to the test persons. This was examined by seeing if it was possible for the participants to identify products for all words and whether the answers indicated some sort of agreement on their meaning. This requires a subjective evaluation from the authors. Method 3 was used similarly to (Johnson et al. 2003) but only for 4 products. The products were selected to cover broadly. Method 3 allow for statistical treatment.

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