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« Product Charisma »

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## PRODUCT CHARISMA

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*“Good technology is not an end in itself. People must have an emotional attachment to products”*

Stefano Marzano, Head of Philips Design, in Echikson, 1999

*“When we succeed, we give birth to a new product that surprises people and manages to touch their hearts”*

Alberto Alessi, CEO of Alessi, in Kirschenbaum, 2001

*“They were patting and caressing the imac, and talking about it in a language usually reserved for small fluffy animals and close family members”*

Jonathan Ive, Head of Apple design, in Redhead, 1998

## **ABSTRACT :**

Consumers are attracted by product designs that feel “alive” and that contain surprise elements. The right expressions in a product contribute to its attractiveness or “charisma”. Today, these intangible product attributes are an important way to differentiate a product from competitor’s products. Companies in mature markets, especially, have a competitive advantage when they succeed in integrating “expressions” or “messages” into the product design that touches its user.

This paper presents a classification of the various expressions that a product can convey. These different expressions are visualised by means of a diagram in which three types of messages are distinguished. The three groups consist of information about the *product* itself, about the product *user* and about the *company*. The product expressions are described in detail and illustrated with recent examples of product designs.

**KEY WORDS :** Design management, product design, product expression, semantics, emotional product value.

## INTRODUCTION

During the last decades, industrial product design has moved from a “rational” approach to a more “psychological” approach in which meaningful expressions in the product’s design have gained importance.

A product can, for example, contain status symbols or look “friendly”. The right messages or emotional values in a product contribute to its attractiveness and influence the buyer’s decision.

The objective of this article is to present an overview of possible messages in a product. It is hoped that this overview can be used as a tool to facilitate the management of the product development process.

The article distinguishes three types of product expressions. These groups consist of messages about the *product* itself (product identity), messages about the product *user* (user identity), and messages about the *company* (company identity). These product expressions are described in detail, visualised in three models and illustrated with recent examples of meaningful product designs.

The first section of this paper describes the commercial importance of product aesthetics that carry a meaning. It also looks at the terminology used for this phenomenon in the design management literature.

The second section looks at the history of product design and the growing emphasis on these communicative product aspects.

In the third section, the focus is on product expression and three diagrams are presented that aim to define the variety of product expression. In this section, the different expressions in a product that might communicate product, user and company identity are described in detail.

The last section provides a summary and indications for future research. In this section it is argued that it both important to understand the *kind of messages* that might be integrated in a product’s design and to comprehend the *development process* of products containing such messages.

### 1. More competition, more messages

Several people in the design field (Eger, 1991; Luh, 1994; Marzano, 2000; McDonagh-Philp et al., 2000) have emphasized the importance of an emotional benefit produced by the messages in a product. This emotional benefit can be a competitive advantage, because it can differentiate a product from competing products with the same functionality.

According to Marzano (2000), head of Philips Corporate Design, companies no longer have to satisfy people's functional needs, but they have to provide them with ways to stimulate their senses. Philips Corporate Design, therefore, aims to design: *“meaningful objects that support people in their daily tasks, express values they believe in, and stimulate their emotions and creativity”*.

Alberto Alessi, the Chief Executive of Alessi, an Italian company, also remarks that a product has to fulfil its function, but that *its emotional function is becoming more important* (Westerlaken, 1999). Alessi produces tableware and other domestic products that often have expressive and non-conventional product designs. According to Alberto Alessi, the company *“dances on the borderline between success and failures”* with its advanced product designs, because *“that's where the next big breakthrough will come from”*. The company aims to be on the cutting edge of design with products that *“surprises people and manages to touch their hearts”* (Kirschenbaum, 2001). For Alessi, the emotional reaction to the product is an important component next to its functional quality.

McDonagh-Philp et al. (2000) summarizes this phenomenon as follows: *“In the design research stages, emphasis is changing from “hard” functionality to “soft” values in product design”*.

Different terminologies are used to describe the soft qualities of a product. McDonagh-Philp et al. (2000) use the term *“emotional domain”, “soft design”* or *“soft functions”* in product design. Durgee (1999) calls this *“product soul”*.

Bürdek and Gros (2000) and Steffen (2000) apply the terms *“product language”* and *“symbolic function”*. Marzano (2000) calls this *“product experience”*. The terminology *“added emotional value”, “emotional fit”* or *“product emotions”* is used by Desmet, Overbeeke and Tax (2001). These terminologies are summarized in the table below.

<b>Terminology for Expression in Product Design</b>		
Product Soul	Durgee (1999)	Rensselaer Polytechnic Institute
Emotional domain, soft design, soft functions	McDonagh-Philp & Lebbon (2000)	Loughborough University & Royal College of Arts Delft University of

Product Meaning	Muller (1997)	Technology
Product language Symbolic functions	Bürdek (1996), Bürdek & Gros (2000), Steffen (2000)	Hochschule für Gestaltung Offenbach am Main
Emotional function	Westerlaken (1999)	Alessi
Experiential design, emotional experiences with products Product experience, useful and meaningful product Pleasure, pleasure benefits, pleasurable products	Kälviäinen (2000),  Marzano (2000) Jordan in Green & Jordan (1999)	The Kuopio Academy of Design  Philips Corporate Design
Added emotional value, emotional fit, emotional product experience, product emotions	Desmet, Overbeeke & Tax (2001)	Delft University of Technology

Table 1: Terminologies to describe product messages

The above terminologies describe the phenomenon at three different levels. The terms “product language” and “emotional domain” are at the first level and indicate the overall *phenomenon* that a product can have communicative qualities.

At the second level the terms could be seen as “*a product with ...*”; for example a product with ... expression, identity, character, soul, personality, charisma, attraction, an emotional function or a symbolic function.

Products with the above qualities can cause a *user reaction*. The expression in the product can have “meaning” for its user or can be felt as providing an “emotional benefit”, a “pleasurable benefit”, or an “emotional experience”.

## 2. History : The growing importance of emotional product value

The movement from product design based on functionality towards product design with an emphasis on communicative product aspects has been gradual.

In 1896, the American architect Louis Sullivan published an essay in which he stated: “form follows function”. He referred to the appearance of the buildings he was designing and the influence of the building’s functions on their shape. The design philosophy “*form follows function*” that was based on this observation, was used extensively thereafter in product design and architecture and persisted until around 1980.

**Functional product styling:** In the period 1919 – 1933, the influential German “Bauhaus” movement used a “functional” product styling. The Bauhaus aimed at adapting the product design to the industrial possibilities of that period. This philosophy of “*design for industry*” combined with

the “*form follows function*” principle resulted in a minimalist product styling that was based on geometrical shapes and few decorations. The product was said to look modern because a machine made it.

The Bauhaus period from 1919-1933 was very short. Only a few product designs from the Bauhaus were commercialised, but some of them (for example, the table lamp by K. Jucker and W. Wagenfeld) are still in production 70 years after its creation. See the figure 1 below.

The durability of the Bauhaus aesthetics highlights the force of the “*form follows function*” principle. After the Second World War, many European Schools of Design were guided by the Bauhaus principles of functionality.



**Figure 1 :** *The Bauhaus table lamp, by K. Jucker and W. Wagenfeld in 1923-1924 (Droste, 1990).*

**Decorative product styling:** Streamlining or aerodynamic product styling became very popular in the United States around the period 1935-1955. With American streamlining, decorative (non-functional) elements were added to the design of consumer goods. See for example the streamlined car design in figure 2.

In the 1930's, the French product designer Raymond Loewy said, "*La laideur se vend mal*", in other words, ugly products are difficult to sell. Raymond Loewy expressed the need for *decorative elements* in product design and used this product styling to promote his services as a product designer in the United States. He was one of the pioneers in the United States to use aerodynamic product styling.

Streamlined styling was first used for the design of aerodynamic products such as cars and trains. When this style was applied to static products, such as refrigerators, commercial success was instantaneous. Streamlining became a meaningful symbol, which signified modernism and technical progress in society.



**Figure 2 :** *Streamline: The Pontiac Silver Streak, 1948, General Motors USA (Kras R. et al. 2001)*

**Meaningful product styling:** The United States was ahead of Europe in applying decorative styles such as streamlining. European design remained dominated by the rational concept of “form follows function” for a long time. In Europe, the real break from the functionalist approach came with designs from the Memphis group (Bürdek, 1996). Since 1981, the Italian design group Memphis created furniture and decorative products, such as lamps and vases. Memphis designs are expressive, often



provocative and cheerful.

**Figure 3 :** *The “Memphis” bookcase “Carlton” designed by E. Sottsass in 1981 (Woodham, 1997)*

The bookcase designed by Ettore Sottsass (figure 3) is an example of the early work in the Memphis design style. It reveals an anti-functional attitude through its use of colour, decoration and experimentation with form and surface (Woodham, 1997).

The interest in the Memphis designs showed the need for change and the increasing interest in *product aesthetics that carry a meaning*. The practical and rational aspects of product design no longer fulfilled all needs and did not dominate the product's shape any more.

The Memphis products received a lot of attention and international companies such as Philips and Sony were influenced by this design philosophy. Many companies in consumer goods started to pay more attention to these expressive product qualities.

### 3. Product Expression

#### 3.1. Theoretical background

In the 1960's, the French philosophers Barthes and Baudrillard started to analyse the socio-psychological meaning of products. Barthes argued in his book "Mythologies" (1957) that objects and images not only signify their basic function, but also carry a "meaning". He discussed the socio-psychological function of objects and referred to the science of signs (also called semiology) that find its roots in linguistic studies (Julier, 1993). The analysis of the sociologist Baudrillard was also based on semiology. In his book "Le systeme des objets" (1969), Baudrillard describes the link between social life and symbols in products (de Noblet, 1993). The two philosophers noticed the socio-psychological significance of products. A few years later, others with a design background started to develop the following design model

In the mid 70's, the theory of *product language* was developed at the Offenbacher Hochschule für Gestaltung. This theory distinguishes "*product functionality*" from "*product language*".

The product's language is divided in "*product meaning*" and "*product aesthetics*". The product meaning (or the sign function) is considered as the *content* of the product language. The aesthetic function is considered as the *grammar* of the product language (Bürdek, 1996; Steffen, 2000). This is depicted in the figure below.

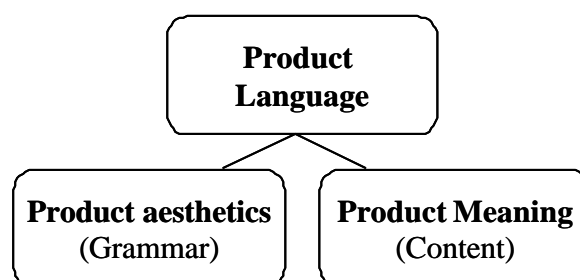


Figure 4 : Basic structure of Product Language by the Offenbacher Hochschule für Gestaltung.

### 3.2. A contribution to defining product expression

In this section the “product meaning” is developed in more detail. This classification is based on findings from literature. In interviews, designers often describe the character of their product designs and refer to a variety of meanings communicated by the product. Their remarks and research from different sources (Steffen, 2000; Durgee, 1999; Kälviäinen, 2000; Marzano 2000; Fayolle 2000, Fishman 1999) have been used to obtain further understanding of the different messages in a product and to develop a classification of “messages” that can give meaning to a product.

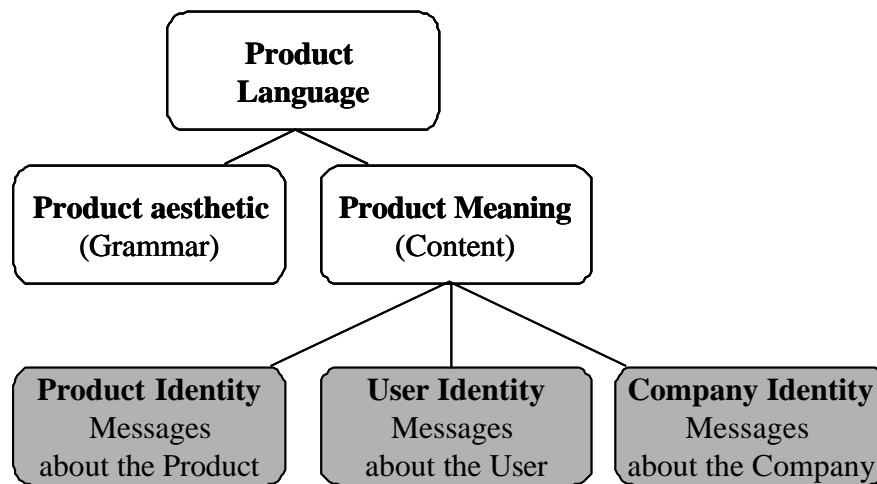


Figure 5 : Summary of different expressions in a product

In this revised model (see figure above), the product meaning is divided into three types of expressions: information about the *product* itself (product identity), about its *user* (user identity) and about the *company* (company identity)..

We will look in detail at each of the three product message groups and will start with an analysis of “product identity”.

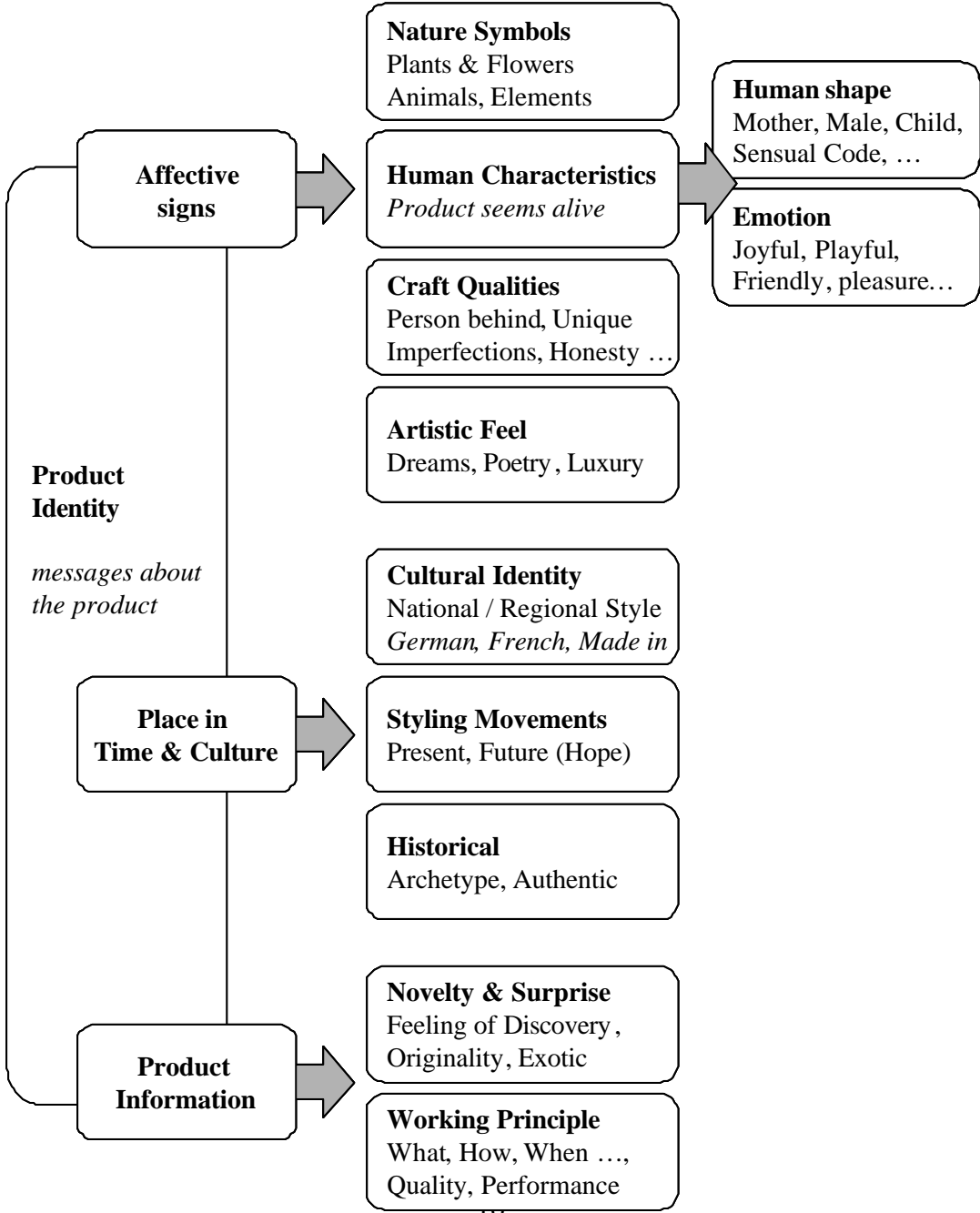
### 3.3. Product identity

Messages about the product provide information about the product itself. The theme “*product identity*” is divided into three subgroups: *product information*, *place in time and culture*, and *affective signs*.

The group *product information* can contain messages about the product’s “working principle” (how, where, and when to use the product) and innovative elements in the product’s design (“novelty and surprise”).

The second group of expressions in a product’s design (place in *culture and time*) can contain “historical” styling elements, be part of a “styling movement” or be the expression of a “cultural identity”.

The third group is called *affective signs*. Affective signs might concern the “artistic feel” of the product, its “craft qualities”, its “human characteristics” or the use of symbols related to “nature”. For an overview of the three types of expressions concerning “product identity” see the figure below.



**Figure 6 :** Signs about the products, its place in time & culture and affection

- **PRODUCT IDENTITY: INFORMATION**

Expressions that give information about the product contribute to a better understanding of the product. In the following sections we will look at symbols related to:

- The product's working principle
- The product's quality
- The product's newness and surprise elements.

**Working principle:** Messages concerning the product's usage give information about what the product does (identification of its function). The design can also express how to use the product and when to use it (for instance, under festive or daily circumstances).

**Quality:** A product can be designed to give an indication about its performance and quality. A product's design can accentuate the product's performance, because product styling can be used to make a product look faster or even more powerful (for example, in car designs).

**Novelty, originality or surprise:** Styling elements can be used to ensure that distinctive, original qualities are noticed within the first moments of decisive contact with the product. Surprise conjured up by the product gives a product an attractive character (Durgee, 1999; Kälviäinen, 2000).

Now we will look at the second sub-group within the theme "product identity". This sub-group places the product in its *cultural context and time frame*.

- **PRODUCT IDENTITY: PLACE IN TIME & CULTURE**

Specific forms or colours give a product a cultural or temporal significance. Historical symbols show "our roots" (Durgee, 1999) or give us a "sense of belonging" (Kälviäinen, 2000). Styling trends gives us "identifying marks" (Starck in Bommel, 1997). Symbols concerning time and culture are related to;

- Historical value
- Styling movements
- Cultural values

**Historical value:** Many products on the market are based on old designs and obtain their appeal from their association with earlier times. Archetypal shapes make a product easily recognisable and give a re-assuring value because “*they make us feel the roots of our identity*” (Durgee, 1999).

The popularity of antique products demonstrates the importance of traditional shapes as well as authentic values. An aspect that is specifically important in antique products is the “*life the product had before*”. Products that according to Durgee (1999) are appealing to certain consumers are products that seem to have a “*soul*”. These products “*look like they have been through a lot*”. They also look like “*they would have many stories to tell*” and they seem to be “*attached to another life*”.

Kälviäinen (2000) also states the special symbolic meaning of the past. Frequently tradition is a metaphor for high quality

**Styling movements:** Often it is possible to recognise the period in which a product was designed. The choice of materials and shapes determines whether a product fits in its period. A sixties’ design has different styling from a product designed in the nineties. This gives the product a modern or old-fashioned look. The French designer Philippe Starck remarks that he tries to work with semantics as a tool. What he does has to be sometimes in line and sometimes in conflict with society. He intends to give a product its “*identifying marks*”. For example every period has its colour (Bommel, 1997).

Kälviäinen (2000) implies that we need such references because “*the connection between history, contemporary time and the future gives us a sense of belonging*”.

**Cultural symbols:** A German style or French look can contribute to the charm and attraction of a product. An example in car design is the more “solid” look of the “German” Volkswagen and the “expressive” look of the “French” Peugeot 206. Additionally, appreciation of colours is not the same in every geographic region; a “wrong” colour can lead to the rejection of a well-designed product.

After the expressions related to “*product information*” and “*place in time and culture*”, we will now look at a third sub-group concerning “*affective signs*”. Affective symbols are currently very present in products.

- **PRODUCT IDENTITY: AFFECTIVE SIGNS**

Affective products have a friendly presence or create user “affinity” (Fayolle, 2000). Different ways exist to create affective products, for example a touch of luxury or craft quality in a product’s design, which can make a product appealing.

Craft qualities ‘*make the product unique*’ and show its ‘*warm human side*’ (Kälviäinen, 2000). Craft qualities even bring a touch of human warmth to product design. A product can have a lively character and somehow look like a new friend. Affective symbols may include signs about nature too. This can be reassuring or poetic for humans in an industrialised world.

In the following text we will look at symbols related to

- Dreams, artistic feel, luxury
- Craft qualities and product uniqueness
- Human characteristics
- Nature

**Dreams, artistic feel and luxury:** According to Alberto Alessi, the Italian producer of expressive domestic objects, art is lacking in many products and “*Objects have to make you dream*” (Westerlaken, 1999). Elements such as dreams, hope for a better future or the illusion of luxury have always been important in products. Design movements such as the Art Nouveau or the Art Deco demonstrate this. Elements of dreams, hope and luxury can be found in the decorative elements of the Art Deco period. At a time of great American economic depression, architects designed buildings that contained the illusions of luxury with decorations that make one dream (of rich cultures of the past).

Products that contain decorations or that feel artistic are special. Such products take time to appreciate (Durgee, 1999).

**Craft qualities and product uniqueness:** Hand-made quality adds personality to a product. Hand-made products give the feeling that there is a person behind the product (Durgee, 1999). The knowledge of the touch of the human hand makes the product more valuable than a machine-made one. It does not feel like a cold industrial product. Apart from this human “warm” side, a hand-made product can be used in the search for individuality. The marks of tools and the involvement of the

crafts person make a product unique. This contributes in its turn to the uniqueness of its user (Kälviäinen, 2000).

Even imperfections in a mass-produced product can make a product unique and therefore personal and valuable. For example, a specific noise in a car makes this car different from other cars and therefore recognisable and personal.

**Human characteristics:** In current product design, the human shape is often present in a simplified and abstract form. Products can be attributed with human characteristics so that humans feel closer to them. We can distinguish designs that are based on the shape of the ‘human body’ and designs that conjure up associations with ‘human emotions’. See figure 8 as an example.



**Figure 7 :** Image of Amora Bottle designed by Barre & Associés (Barré B., Lepage F., 2001).

Within Philips, research is developing in the area of emotional product experience and communicative needs. Stefano Marzano, managing director of Philips Design, is managing several research projects on future design concepts. Different disciplines such as social sciences, cultural behaviour, and production technology work together in these projects (Bürdek et al, 2000).

Marzano (2000) explains that the ‘anthropomorphic’ form of the Philips web-cam creates a friendlier relationship with its user (see figure below).

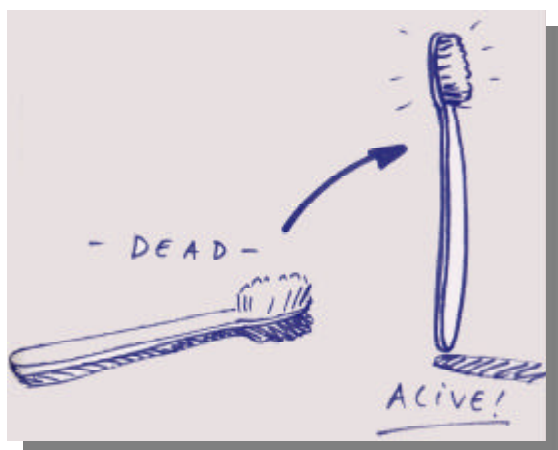
According to the Industrial Designers Society of America (IDSA), animation and softness are present in this ‘playful new creature’. Philips Corporate Design received the ISDA 1999 Gold Industrial Design Award for the design of this web-cam.



**Figure 8 :** Philips web cam with lively characteristics.

The Italian psychoanalyst, Franco Fornari, developed a theory on symbolic-affective codes. These codes are inspired by the human body shape and consist of the “mother-code”, the “father-code”, the “child-code”, the “erotic code” and even a code referring to “death” (Westerlaken, 1999). According to Alessi, these codes appear to be a useful instrument to express the language of products, but he explains the difficulty in developing an object that is both expressive and popular in a mass-market (Westerlaken, 1999).

Durgee (1999) argues that the object of marketing is to give a product a personality or a soul, or in other words: “to make it come alive”. This was exactly what happened when the French design agency Barré & Associés designed a new children toothbrush for Signal. The product feels rather “lively” as it is standing up and has a body and a head (Barré et al., 2001).



**Figure 9 :** The product idea and the creation of a Signal toothbrush (Barré B., Lepage F., 2001)

The Apple iMac and iBook give the feeling of a product that is alive too. These computers have a light that blinks on and off when the computer is in its standby mode. Many people have described it as breathing and beating: “*The iBook breathes*” (Fishman, 1999). Humour and enjoyment can be integrated into a product on purpose. Jonathan Ive, the designer of the Apple iMac explains that the



team aims to design products that people enjoy (Fishman, 1999).

**Figure 10 :** *The new iMac with flat screen*

Apple also gave life to its most recent iMac with a flat screen that was launched in January 2002. This new iMac can be adjusted at different angles. This time the design was not based on human characteristics, but on nature. Steve Jobs has this to say about the new computer: “*Instead of looking like the old iMac, it looks like a sunflower*”.

**Nature symbols:** Many elements in the Art Nouveau movement were based on romantic flower patterns. Animal shapes can be found in the more recent movement of Bio-design, used considerably in automotive design between 1980 and 1990. Durgee (1999) found that elements in the product showing *close connections with nature* and natural forces contribute to the personality, or what he calls “high soul”, of the product.

Not only the shape of the product, but also the materials can create a “feeling” for the product. An organic material such as wood is perceived as a warm and “living” material. Inorganic materials such as marble, glass or metal are perceived as cold, hard, industrial and “dead” materials. *Natural materials* have distinctive smells and sounds and simply refer to nature. While we live in busy cities,

we may try to bring back our past connection with nature by using natural materials and shapes in our products (Kälviäinen, 2000).

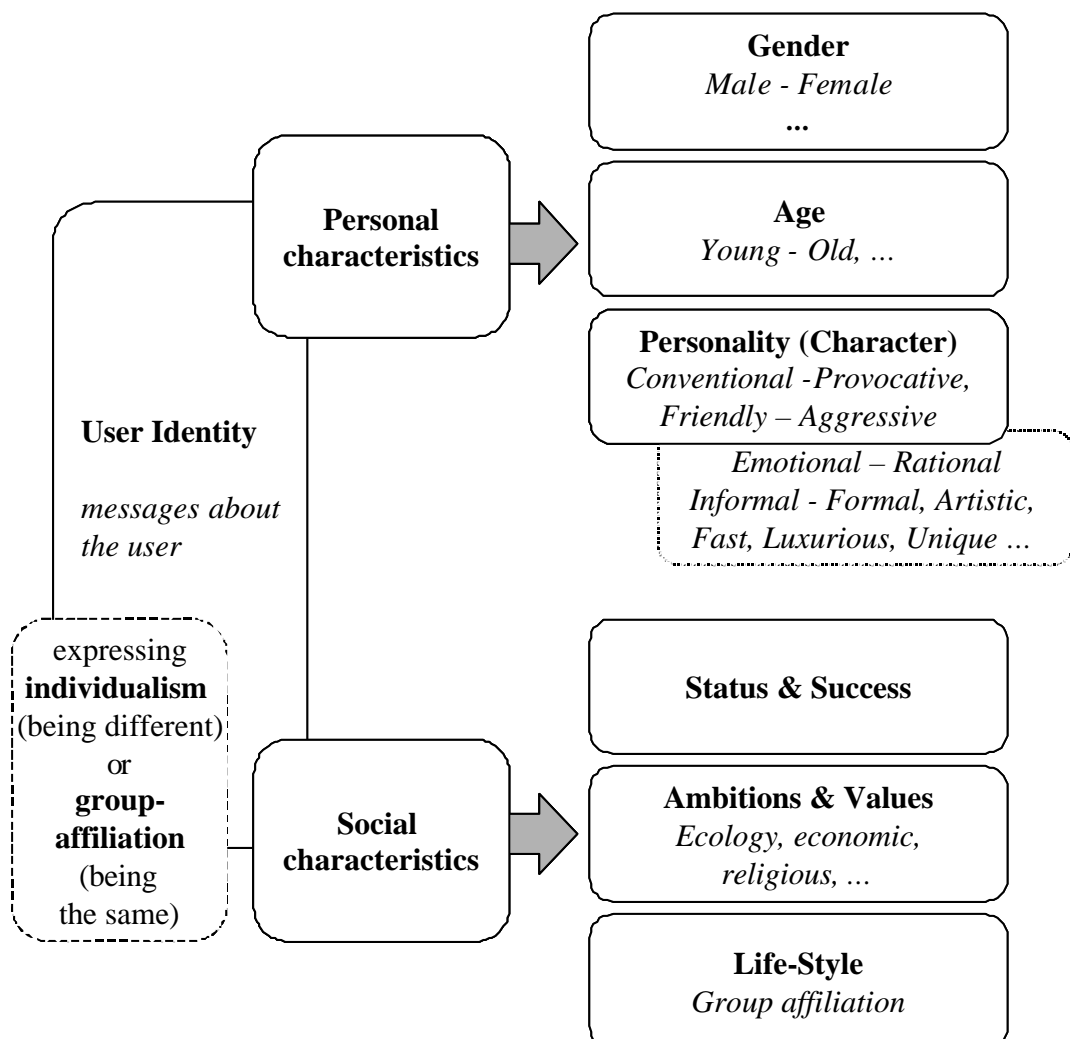
We have discussed many messages that express something about the product, such as how the product works, its cultural context or its affinitive character. Now we shall be looking at a second theme: messages in the product that express its user's identity.

### 3.4. User identity: being the same or different

A product user can choose to be "the same" or, on the other hand to be "different" from others and he / she can use a product to communicate this choice.

The product's design can communicate the user's "*personal characteristics*" such as "age", "gender" (female or male) and / or "personality". For example, a car might be imagined to be fast and its owner can also be imagined as having the same quality. This means that the styling of the car is used to communicate a supposed personal characteristic of its user.

A product can express *social characteristics* too. For example, the product can provide "status" or demonstrate the success its owner has in life, it can reflect its user's "ambitions or beliefs" and the

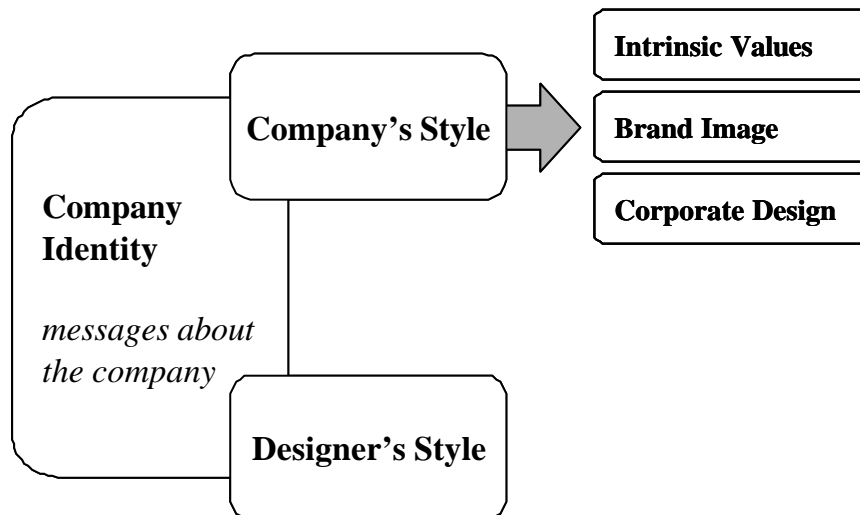


person's "lifestyle".

**Figure 11 :** Messages about the product user in the product's design

### 3.5. COMPANY IDENTITY

The third major theme to be discussed is the "company identity" that is transmitted by the product. Some of the company's intrinsic values might become visible through its products. For example, Apple Computer, whose slogan is "Think different", distinguished itself from competition by being the first company to sell *coloured* computers in a very *friendly* and *different* design (Thibault, 1999; Redhead, 1998). All competitors' products had beige or grey colours and a technical product shape. Apple's different approach was a success. The Apple iMac was launched in August 1998 and in the first year 2 million iMacs were sold (Fishman, 1999).



**Figure 12 :** Company image and designer's style expressed by a product

Swatch and Bang & Olufsen are two other examples of companies with a clearly recognisable style. In some cases the designer has an expressive personal style and the companies demand this "design signature" in its product. Examples are the watches designed by Mendini or Haring for the art collection of the Swatch watches (Hayak et al. 1991).



**Figure 13 :** *Swatch designed by Keith Haring in 1985 (Edwards, 1998)*

#### **4. Summary and future Research**

As shown in the previous sections, products can contain a variety of messages. It is important to obtain a good understanding of this facet of a product's design, because meaningful symbols today are an important way to differentiate a product from the competitor's products. Consumers are attracted by product designs that feel "alive" and that contain a surprise element. When competition grows, improving the product's emotional quality becomes essential for a company.

In this article a classification of expressions that can give meaning and attraction to a product's design was presented. The three models in this article (figure 6, 11 and 12) summarise the variety of expressions that we might find in a product.

In further research this theoretical classification needs to be compared with design practice. The *development process* of products with "charisma" also needs to be analysed in further, because it is not only important to know *what kind of messages* is integrated in a product's design, but also to analyse *the methods used* in design-oriented companies to obtain a product with "added emotional value".

Future exploratory case study research is, therefore, planned on companies with a very strong design orientation. These companies will be active in a competitive consumer goods market, because a competitive environment is expected to incite the creation of product expression.

Several factors such as an *open-minded company culture*, the *experience of people involved in the project* and a *sensitive user-focused approach* are expected to be key factors in the development of intangible product qualities that contribute to product charisma.

## REFERENCES

BARRE B. et LEPAGE F. (2001), *Une nouvelle approche de la création produit*, Les Presses du Management, Paris.

BOMMEL S. (1997), Philippe Starck : “Mettez de l’amour dans le produit”, *L’Essentiel du Management*, Février 1997, p122-125.

BÜRDEK B. (1996), *Design : Geschiedenis, theorie en praktijk van de produktontwikkeling*, Uitgeverij ten Hagen & Stam, The Netherlands.

BÜRDEK B. and GROS J. (2000), The Offenbach Approach: Design Theory and Design Research in a Disciplinary Way, *Proceedings of the International Symposium on the Dimensions of Industrial Design Research Conference*, Politecnico di Milano, 18-20 May, Italy.

DESMET P., OVERBEEKE K. and TAX S. (2001), “Designing Products with added Emotional Value : Development and Application of an Approach for Research Through Design”, *The Design Journal*, Volume 4, Issue 1.

DROSTE M. (1990), *Bauhaus 1919-1933*, Le Bauhaus-Archiv Museum für Gestaltung Berlin, Taschen Verlag, Köln.

DURGEE J. (1999), Product soul, presented at the *Third International Conference “Design Cultures” organised by Sheffield Hallam University and the European Academy of Design*, 30 March-1 April 1999, Sheffield, England.

ECHIKSON W. (1999), “It’s Snazzy, it’s Sexy, it’s ... Philips”, *Business Week*, November 22.

EDWARDS F. (1998), *Swatch : Le guide du Connaisseur et du Collectionneur*, Quintet Publishing Limited, Londres.

EGER A. (1991), *Digitaal Vormgeven*, Canteecleer, De Bilt.

FAYOLLE C. (2000), “Le design explore”, *Beaux Arts magazine*, Janvier, N°188, 94-97.

FISHMAN C. (1999), “The Commerce of Design / The Design of Commerce”, *Fast Company*, November, p281-290.

HAYAK N., CALABRESE O. and SCHIFFERLI C. (1991), *Swatch after Swatch after Swatch*, Electra, Milan.

JORDAN P. (1999), in *Human Factors in Product Design*, (Green, W. and Jordan, P.), Taylor and Francis, London.

JULIER G. (1993), *Dictionary of 20<sup>th</sup> Century Design and Designers*, Thames and Hudson, London.

KÄLVIÄINEN M. (2000), “The Significance of Craft Qualities in Creating Experiential Design Products”, *The Design Journal*, Volume 3, Issue 3.

- KIRSCHENBAUM J. (2001), "Failure is Glorious", *Fast Company*, October, p34-38.
- KRAS R., van der Windt H. (2001), "*Streamline: the Dawn of Tomorrow*", Stedelijk Museum, Amsterdam.
- LUH D. B. (1994), "The Development of Psychological Indexes for Product Design and the Concepts for Product Phases", *Design Management Journal*, winter, pp30-39.
- MARZANO S. (2000), "Suffusing Design Through the Organisation", *Design Management Journal*, Winter.
- McDONAGH-PHILP D. and LEBBON C. (2000), The Emotional Domain in Product Design, *The Design Journal*, Volume 3, issue 1.
- MULLER W. (1997), *Vormgeven: ordening en betekenisgeving*, Uitgeverij Lemma, Utrecht, The Netherlands.
- NOBLET de J. (1993), *Design, Mirior du Siècle*, Flammarion, Paris
- REDHEAD D. (1998), Apple of our Ive: the man behind the iMac, *Design*, Design Council, Autumn.
- STEFFEN D. (2000), *Design als Produktsprache*, Verlag form GmbH, Frankfurt am Main.
- THIBAUT B. (1999), "Steve Jobs: retour d'un créateur mythique", *Le magazine Accor*, Mars, N° 12.
- WESTERLAKEN N. (1999), "Poëzie van potten en pannen", *Volkskrant Magazine*, October, N° 9, p56-59.
- WOODHAM J. (1997), *Twentieth-Century Design*, Oxford University Press, Oxford.