



Relationship between meanings, emotions, product preferences and personal values. Application to ceramic tile floorings



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ABSTRACT

This work aims to validate a conceptual framework which establishes the main relationships between subjective elements in human–product interaction, such as meanings, emotions, product preferences, and personal values. The study analyzes the relationships between meanings and emotions, and between these and preferences, as well as the influence of personal values on such relationships. The study was applied to ceramic tile floorings.

A questionnaire with images of a neutral room with different ceramic tile floorings was designed and distributed via the web. Results from the study suggest that both meanings and emotions must be taken into account in the generation of product preferences. The meanings given to the product can cause the generation of emotions, and both types of subjective impressions give rise to product preferences. Personal reference values influence these relationships between subjective impressions and product preferences. As a consequence, not only target customers' demographic data but specifically their values and criteria must be taken into account from the beginning of the development process. The specific results of this paper can be used directly by ceramic tile designers, who can better adjust product design (and the subjective impressions elicited) to the target market. Consequently, the chance of product success is reinforced.

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1. Introduction

A review of the concepts, models, and tools related to human–product interaction and affective design allows different types of subjective impressions to be identified. Although the techniques of affective design are largely based on the principles of the Semantic Differential (Osgood et al., 1957), which analyzes the meanings given to the product, other proposals (Desmet, 2002) focus on the study of emotions (triggered within the individual and referring to her/him). Only a few proposals (such as Desmet and Hekkert, 2007; Crilly et al., 2004) consider and distinguish both concepts. Although they refer to different elements (product and individual, respectively), the meanings and emotions generated by a product probably maintain some kind of relationship between them. Some authors (Desmet and Hekkert, 2007; Crilly et al., 2004) assume that the elicitation of emotions is subsequent to the generation of product meanings (and a consequence of it).

Several types of meanings can be distinguished in a product, including aesthetics, functionality, symbolic values, etc., which

have been given different denominations in the literature, such as product messages (Monö, 1997), communicative functions (Bürdek, 1994) or roles of product appearance (Creusen and Schoormans, 2005). The aesthetic function is often considered as a separate aspect (Desmet and Hekkert, 2007) and not as a part of the semantic dimension (Bürdek, 1994). Other authors (Crilly et al., 2004) apply the denomination “semantic interpretation” only for what the product says about functionality performance, efficiency, and ergonomics. On the other hand, the semantic components are sometimes included in the aesthetic value of the product (Quarante, 1992).

Regarding emotions, some authors (Norman, 2004; Jordan, 1998, 2000) relate affects (emotions are considered to be a type of affect) with the communicative functions mentioned above. There is no consensus on which emotions can be considered product emotions. Some sources distinguish between primary and secondary emotions, or use terms such as emotional features (Chakrabarti and Gupta, 2007), while others do not take into account these distinctions when it comes to selecting product emotions. The classification proposed by Desmet (2003), based on the type of assessment that generates the emotion, is one of the most complete.

The elicitation of meanings and emotions (from now on, subjective impressions) is part of the process of communication between

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the individual and the product, and the senses are the starting point (Fenech and Borg, 2007) of this physical interaction. Moreover, this interaction may depend on the type of communication between the product and the individual. In this regard, some works have studied the influence of the intensity of the interaction, depending on the senses involved (Artacho-Ramírez et al., 2008; Vergara et al., 2011) or on the type of interface (image, prototype...) used (Hwang et al., 2013; Sauer and Sonderegger, 2009). Then, after the objective sensorial part of the process has occurred, the subjective sphere comes into play. The information captured by the senses is analyzed, organized, and interpreted, thus enabling the association of meanings to the product, and the elicitation of emotions.

These meanings and emotions will give rise to an assessment of the product, product preferences or, as some authors call it, behavioral responses. Thus, for an interested consumer, the behavioral response is called approach (purchase, use of the product, etc.), while for a disinterested one, the response is an avoidance or withdrawal of the product. But the preferences generated can also depend on the personal reference values. In the process of generating an assessment, a set of factors such as memory, previous experiences, culture, training, internal and learned rules, and also own emotional traits, can all play a part. In the literature all these personal values and criteria are denominated concerns (Desmet, 2002; Fenech and Borg, 2007), sociological values (Mantelet, 2006), or variables (Janhager, 2005). These personal reference criteria are part of the human diversity that should be understood in order to add value in product design and use (Khalid, 2006). Accordingly, this human diversity should be taken into account in frameworks for affective design, since it affects individual design needs (Khalid and Helander, 2004; Helander and Khalid, 2006; Khalid, 2006). Moreover, reference values should be considered as a possible influence on the relationship between meanings and emotions and product preferences: people's emotional responses to products seem to vary between different generations, social groups, nationalities and cultures (Demirbilek and Sener, 2003). Cultural differences can even influence on the product attributes that trigger strong emotional responses (Seva and Helander, 2009).

These elements of human–product interaction (meanings, emotions, preferences, and reference values) and their relationships explained in previous paragraphs can be considered together in a model to understand the Subjective Impressions in Human–Product Interaction (SIHPI). The SIHPI model (Fig. 1) attempts to fill the gaps identified in previous partial models, taking from each one interesting aspects for the intended objectives. This model is widely explained elsewhere (Agost and Vergara, 2010). The SIHPI model can be used as a theoretical basis for the application of design tools that take into account subjective impressions elicited by the product in the different stages of the product lifecycle, specially design and development.

Some methods are focused on the study of product design elements and their relationship with affective aspects (like feelings, moods or emotions). The Kansei Engineering technique looks for translating customers' feelings into design elements (Nagamachi, 2002; Yang, 2011). These studies are very useful for designers to create products adapted to users' preferences in a specific moment. However, the relationship between specific design elements and product preferences can quickly change with trends, and also depending on the type of product, while the relationship between the subjective impressions elicited and product preferences may be more stable over time. Moreover, personal values have influence over this relationship. For instance: A trendy person will wear fashionable clothes, throughout her/his life. But the design elements of these fashionable clothes, like colors in style, will vary according to trends. So, she/he will always prefer “modern” clothes,

but modern style will be associated to different design elements throughout her/his life: red color, fit style, and so on.

In this work a study to analyze these relationships is described. Particularly, the analysis focuses on the relationship between product meanings and emotions, the relationship between both types of subjective impressions and product preferences, and the possible influence of personal reference values on the previous relationship. The products selected for the study were ceramic tile floorings, whose designs are highly influenced by fashion, and consequently by subjective impressions. They are, as defined by Seva et al. (2007), high-involvement products, that is, products that involve people in the purchasing process, are likely to elicit reactions, are usually expensive, and express the purchaser's personality.

2. Materials and methods

To analyze the relationships between the main elements of the SIHPI framework, an experiment with ceramic tile floorings, based on questionnaires, was designed. A detailed description follows.

2.1. Selection of the subjects

283 adults participated in the study (158 male, 125 female). A website was implemented for the questionnaires, which were distributed to different types of customers or decision agents of ceramic design: actual or potential users of the product, architects, distributors, ceramic tile designers, etc. The link to the questionnaire was distributed by e-mail to workers of the university, friends and acquaintances of the members of the research group, and to professional associations and enterprises of the ceramic sector. Several gifts were raffled among the participants who filled out the whole questionnaire to encourage participation.

2.2. Selection of the ceramic tile floorings

A total of 19 ceramic tile floorings were selected from recent catalogs. They were chosen to elicit very different subjective impressions and product preferences. 3D rendered images of a neutral room were used to show the different floorings. As pointed out by previous authors (Alcántara and Zamora, 2006), the floorings used in the main parts of the house (living rooms, dining rooms or bedrooms) contain a greater emotional component than the floorings for kitchens and bathrooms. Therefore, the elements of the room were chosen to be reminiscent of a neutral living room or bedroom. The images lacked any other decorative elements – except windows and doors – that could influence the subjective response. The format of the floorings was superimposed onto the rendered image and shown in the lower left corner of each image (Fig. 2).

2.3. Description and selection of semantic, emotional, and reference value descriptors

To obtain the initial semantic and emotional universes, a comprehensive set of adjectives, nouns, and other words related to ceramic tile floorings was compiled from ceramics companies' websites, catalogs, articles, and advertising in specialized journals, as well as words used in previous semantic studies and emotional tools (Lindberg, 2004; Alcántara and Zamora, 2006; Desmet, 2002; Mantelet, 2006). The initial semantic universe obtained consisted of 179 words and the initial emotional universe consisted of 32 words/phrases. To achieve reduced semantic and emotional universes, the affinity diagrams technique (Dahan and Hauser, 2002) was applied by the authors. Some terms with very similar meaning

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