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Meanings attached to industrial design objects

Emotion and industrial design: Reconciling meanings and feelings

Industrial design is a form-giving process which addresses the surface appearance of objects in relation to function and construction (Smets & Overbeeke, 1995). The object must fulfil a certain function, provide relevant controls, and ergonomically fit the user. Typically, the user-object interface has been analyzed from a cognitive/behavioural viewpoint focusing on the utilization of these designed objects. An emphasis is placed on cognitive processes involved in the *acquisition* of skills needed to use the object and on the behavioural processes that underlie *performance* with it. Emotional processes involved in generating and using industrial design objects have only begun to be explicated. They begin with an initial impression of the object, continue through actual experiences utilizing it, and culminate with degrees of emotional attachment to it. The strategy used in this paper involved distinguishing the kinds of meaning which might be attached to industrial design objects and then considering how they relate to emotional processes. Three kinds of meaning attached to industrial design objects were distinguished: *sensory/aesthetic*, *cognitive/behavioural*, and *personal/symbolic*. These were related to two contrasting emotional processes associated with *action* and *reaction*.

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When we think about the interface between people and tools or instruments *cognitive/behavioural* meanings are central. These meanings integrate the structural, functional, and ergonomic features of tools with user expectations and knowledge. They provide a critical bridge between the purpose and structure of industrial design objects and users who must understand and utilize them. The acquisition of knowledge about the object and its use is facilitated by simple and clear design properties. A high level of novelty and complexity in design might make the object appear interesting but, according to Berlyne's (1971) analysis, it would also be less pleasing. The behavioural component of meaning relates to performance and ease of use of the design object, both alone and in conjunction with other tools. It is here that bodily arousal processes help or hinder performance and where success or failure in the use of the tool shape feelings of pleasure or frustration, respectively.

In everyday perception, *sensory* information of a visual, auditory, tactile, taste, or scent nature

facilitates object identification and is then discarded (Lockhart, Craik, & Jacoby, 1976). Thus, a round shape and colour red might imply an apple, but neither the shape nor the colour are given a second thought. However, from aesthetic and expressive viewpoints, sensory qualities and their organization are valued in and of themselves. The *Aktualgenese school* of the 1920's, an off-shoot of Gestalt psychology, affirmed the emergent nature of perception and the primary role played by sensations. Arnheim (1971) has argued that in fact "expression is an inherent characteristic of perceptual patterns" (p. 433) embodying "Motifs like rising and falling, dominance and submission, weakness and strength, harmony and discord, struggle and conformance, [that] underlie all existence" (p. 434). Thus, sensory qualities can have an immediate and direct effect on experience through brain activity (as when the colour red elicits a feeling of approaching warmth, while blue evokes a feeling of receding coolness). They can metaphorically foreshadow the cognitive meaning of a design object (as when a coarse texture evokes a sense of ruggedness in an outdoor product). Cross-modal interactions of stimuli that resonate together (e.g., a sound that elicits the experience of a colour) have also been observed (Smets & Overbeeke, 1989).

Personal/symbolic meanings relate to self-concept and dynamic processes affecting both a person's motivation for engaging an industrial design object and also how it is seen. These motivations can lead a person to project supplementary meanings onto industrial objects which may not be directly related to their functions or appearances. At the most superficial level, an object can be seen by the user to *resonate* with and be *symbolic* of the self. Thus, perceiving oneself as rich and powerful might lead to conspicuous consumption, such as owning a luxurious car or wearing designer apparel. At a more profound psychodynamic level, having and utilizing an object can *compensate* for an unconsciously felt inadequacy. This felt inadequacy may be a product of an individual's life history or induced as a result of social values and norms, for example, about appropriate masculine or feminine styles (Cupchik, Leonard, & Irvine-Kopetski, 1998).

The meanings of industrial objects can therefore be viewed as multileveled, comprising *sensory/aesthetic*, *cognitive/behavioural*, and *personal/symbolic* domains. The relative importance of these three domains can vary from object to object, in various contexts, and for different people. Sensory/aesthetic meaning

would be primary in a decorative context, while cognitive/behavioural meaning would be central in a purely instrumental context, and personal/symbolic meaning would be critical when the object has social value. Accordingly, the ultimate *meaning* of industrial objects for individual users is *indeterminate* and *open to interpretation*. It is therefore essential to avoid the notion of industrial design objects as static in meaning and appreciate that, like paintings and literary works, their meanings evolve over time. Ideally, the three domains merge coherently, spontaneously, and immediately in a highly successful industrial object. *Its sensory qualities imply the function of the object and engage the user in a person way both consciously and unconsciously.*

Feelings and Emotions

Dimensionalized Feelings and Active Emotions

One of the traditional approaches to emotion focuses on dimensions of bodily response such as pleasant-unpleasant, excited-calm, and strain-relaxation (Wundt, 1896; cited in Izard, 1971). More recently, Osgood's three verbal dimensions (Osgood, Suci, & Tannenbaum, 1957), evaluation (displeasing-pleasing), activation (relaxed-tense), and potency (weak-powerful) have been central factors underlying judgments of stimuli (Berlyne, 1974). Behaviourism and its cognitive successors have linked arousal to instrumental stimuli (Duffy, 1962) or cognitions (Mandler, 1962; Schachter, 1964) that provide direction and determine whether stimuli are approached or avoided. The formula COGNITIVE MEANING + AROUSAL = EMOTION merges the analytical approach of British Empiricism with the mechanistic principles of behaviourism.

Arousal plays a role in processing cognitive/behavioural meaning. While moderate levels of arousal foster concentration on tasks at hand (Pribram, 1967), excessive levels of arousal interfere with task performance. Thus, when designing an industrial object it is essential to give consideration to the cognitive load involved in using it. Operating a machine presumes an understanding of how it works and an ability to process the relevant information at an appropriate rate. Excessive uncertainty surrounding technical aspects of operation can increase arousal to an excessive level and interfere with performance leading ultimately to avoidance.

It can further be argued that basic stimulus qualities modulate the *simple feelings* (Young, 1973) of arousal or pleasure (Cupchik, 1995). Thus, *novelty* in a stimulus can generally increase arousal, while *uncertainty* (in a detective novel or suspense film) might alleviate a state of boredom or low arousal (Cupchik, 1996). In a parallel manner, sentimentalized images in art (Winston & Cupchik, 1992) or literature can elicit *warm* feelings in the viewer/reader. When particular stimulus properties modulate simple feelings of pleasure or arousal, the basic principles

78 of behaviourism readily apply. For example, repeated exposure to a stimulus will reduce its potency for eliciting pleasure or arousal through the principle of habituation (Cupchik, 1995).

Active emotions result from purposive actions which are attempts at executing goal-oriented plans (Oatley, 1992). They are part of the overall package involving plans and expectations, and are elicited by isolated elements or fragments of the stimulus situation which take on meaning in relation to goals. Realizing one's goals can elicit feelings of pleasure, while frustrating tension might result from unexpected hindrances. Active emotions are produced by a *match* between expectations and outcomes with a *match* (i.e., goal realization) yielding positive emotions and a *mis-match* (i.e., frustration or failure) producing negative emotions. Thus, a common modulating process links responses to arousing and pleasing stimuli and to goal-oriented activity.

Primary and Reactive Emotions

The category perspective on emotion (see Izard, 1971) distinguishes *primary* affects, such as happiness, sadness, fear, or anger, which are wired into the brain and tied to particular visceral reactions or facial expressions (James, 1894; Ekman, 1992). These *organic feelings* (Young, 1973) are primary in that they have profound implications for the life experiences, memories, and expectations of people. Combinations or blends of primary affects take on subtle shades of meaning in different situations. These situational contexts are more complex and multileveled than the isolated stimulus properties discussed in relation to active emotions. People have to experience and interpret situations in their totality in order to determine their personal impact. To the extent that particular situational patterns become repetitive, a prototype or paradigm is established for spontaneously evoking (i.e., conditioning) *reactive emotions*. When industrial design objects are understood in a broader social

and personal context, we see the potential for establishing emotional attachments to them. Personal experiences and emotional meanings complete the image of the object whose appearance and functions are but initial cues as to their broader meaning. *The more an individual consciously or unconsciously relates to the sensory/aesthetic, cognitive/behavioural, and personal/symbolic qualities of an object, the more profound will be the attachment.*

Applications

Let us apply these complementary dynamics to the processes of design creation and reception. In contrast to artworks, industrial design objects are intended for practical use in everyday life and mass consumption. Since the object is essentially a tool, the design process is governed first and foremost by goal orientation. The creator of the object has in mind a certain purpose which is incorporated into its design. Success occurs when the object *matches* (see Cupchik, 1992), in its structure and function, an idealized conception of its design and purpose. The user similarly attempts to achieve a match between a mental model of how to use the object and actual performance experiences with it. *This process is stimulus focused, including both the structural properties of the object and rules that guide its use.* It falls primarily within the framework of *action-oriented* emotions which contrast goal attainment (i.e., successful use of the object) with goal frustration (i.e., difficulty using the object or a breakdown in the object proper). Moderate arousal can focus attention and enhance performance, while extreme arousal in the form of tension or anxiety can interfere with performance. Feelings of pleasure will mirror relative success or failure in the use of the design object.

A second process revolves around the creator or user's overall *image* of the object and how it is *perceived* and *interpreted*. As in the case of a good short story or novel (Iser, 1978), the designer can lead the user along by suggesting certain images. But it was noted at the outset that there are indeterminacies (i.e., degrees of freedom) in the interpretive process and this is where individual differences have their effects. People can differentially attend to the sensory qualities of the design object and attach diverse personal meanings onto it because they see it used in various contexts. Their *reactive* emotions will therefore reflect personal associations and meanings which are projected onto the object. From a subjective viewpoint, a successful image is one in which the sensory, technical, and personal meanings are experienced *coherently*. This is more difficult to predict because the range of personal meanings can be quite broad. It is here that it would be particularly helpful for the designer to have in mind the needs and expectations of the target population.

The central point of this analysis is that the teaching of industrial design has focused on structure and function of the object and requisite cognitive/behavioural skills in the user. The skilled designer has in mind a library of accessible images and ideas of which the new object is a transformation, incorporating new features in an original expressive way. Within this framework, emotion is understood as an *active* process which facilitates, hinders, or is a product of user-object inter-

action. I want to argue that young designers must learn to shift from this *stimulus orientation* and adopt the user's subjective viewpoint. This viewpoint places the design object in various *contexts of utilization* and considers possible *reactive emotions* that it elicits along with conscious and unconscious motives for engaging it.

80 Shifting back and forth between objective (stimulus oriented) and subjective (response oriented) perspectives should help the designer address the object not only as something useful that works according to particular rules but also as a meaningful image that encompasses sensory qualities and personal meanings. In the end, the goal of product designers is to search for coherence between the different layers of meaning that underlie the object. The object will be more successful to the extent that its sensory/aesthetic qualities metaphorically echo and are incorporated into its intended function, and its image fits into a wide range of personal meanings. This will be reflected in speedy selection of the object over alternatives, a more successful process of skill learning related to its functional application, deeper attachment in the sense of continued use in the face of possible alternatives, and long term product commitment.

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