Chapter 15

Psychophysiological Applications in Kansei Design

Pierre Lévy
Eindhoven University of Technology, The Netherlands & Chiba University, Japan

Toshimasa Yamanaka
University of Tsukuba, Japan

Oscar Tomico
Eindhoven University of Technology, The Netherlands

ABSTRACT

In order to describe emerging methods and means for Kansei design, this chapter overviews three approaches involving an intense collaboration between the fields of design and psychophysiology: The use of tools built for psychophysiology and of techniques based on constructivist psychology theory, in order to support designers’ inspirational work focusing on human beings’ behaviors, experience, and mental constructs; The use of knowledge created by psychophysiological research as an inspirational source of knowledge and as a conveyor of it for all along the design process. This approach takes into account the latest scientific progresses in psychophysiology, and concerns greatly about the scientific nature of the considered knowledge; The use of psychophysiology tools to complete design requirements. Each approach presented here is supported by an applicative example. These interdisciplinary approaches lead towards the structuring of Kansei Design as an application field of Kansei Science.

1. INTRODUCTION

The global aim of Kansei design studies is to bring Kansei related aspects to design methods and means, ultimately targeting the improvement of design outputs. The motivation of such target is to improve the relationship between an individual (the user) and her/his environment (whether it is physical or social one). This can be done by understanding and evaluating better designers and users’ Kansei, and by using this knowledge in the design of new products and systems.

To do so, Kansei design studies mainly uses tools and knowledge created by Kansei studies, which gather all the activities aiming together at measuring and evaluating Kansei, and at taking benefit of this to improve the world (through design outputs). Kansei Engineering has been the
first, and so far the most successful design method created to involve some Kansei considerations in the design process. Yet, other methods have emerged and have considered other approaches than the one of Kansei Engineering. These new approaches we are focusing on in this chapter have brought the particular attention to psychological and psychophysiological tools and techniques in order to deepen the understanding of Kansei impact on users’ behavior, focusing on the notions of experience, perception, and mental imagery. Mental imagery is a

*quasi-perceptual experience; it resembles perceptual experience, but occurs in the absence of the appropriate external stimuli. It is also generally understood to bear intentionality (i.e., mental images are always images of something or other), and thereby to function as a form of mental representation.* (Cornoldi, De Beni, Mammarella, & John, 2008)

Notwithstanding, all these approaches, including obviously Kansei Engineering, share the common aim to increase and to improve Kansei considerations in design.

As measuring other high-functions of the brain, measuring Kansei cannot be achieved directly. What is observed is not Kansei but the causes and the consequences of the Kansei process (Lévy, Nakamori, & Yamanaka, 2008). Therefore, to determine some characteristics of Kansei, researchers often work on correlating different elements “surrounding” Kansei. These can be evaluated by measuring sensory activities, internal factors, psychophysiological and behavioral responses, and finally environmental elements. In the scope of Kansei studies, sensory activities are measured by evaluating the impact of a specific sense stimulus on brain activity. Physiological measures are done by evaluating responses to specific external stimulations.

This chapter proposes a brief overview of emerging methods used in the field of Kansei design. These methods are all a fruitful output of a collaborative work and exploration between the fields of industrial design and of psychophysiology. By working together, these two fields are aiming at improving knowledge related to both user’s and designer’s behavior and at producing significant findings for design processes and design output.

After providing an introductive background on Kansei design, this chapter will describe three different approaches involving psychophysiological means in Kansei design processes:

- The use of tools built for psychophysiology and for constructivist psychology in order to support designers’ inspiration focusing on human beings’ behaviors and mental schemes;
- The use of knowledge created by psychophysiological research as an inspirational source for industrial design, taking into consideration the latest scientific progress in psychophysiology.
- The use of psychophysiology tools to complete design requirements.

These three approaches may not be an exhaustive list of all the design approaches involving psychophysiology (e.g. Schifferstein & Hekkert, 2007). As it will be detailed in the introduction of the next section, other works exist and take a different path than the ones presented here. However, they cover together a significant set of possibilities concerning interdisciplinary collaboration between Kansei design and psychophysiology. Indeed, these three methods points out ways to work with psychophysiological means, methods, and knowledge, in order to contribute to various steps of the design process (ideation, analysis, synthesis, and design requirement achievements).

As a conclusion, a short reflection will be carried out on the specificity of this approach in Kansei design.