



Beyond Kansei Engineering: *The Emancipation of Kansei Design*

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For over three decades, kansei engineering has expanded greatly and has become a significant discipline both in the industrial and the academic worlds. In this paper, I present the current situation of kansei engineering, and plead for the emancipation of other disciplines, as part of kansei research as well. By reconstructing the historical path of kansei research and exploring the variety of disciplines within kansei research, I point out the opportunities for kansei design to emerge. Whereas kansei engineering and kansei science have found their roots in scientifically established approaches (respectively engineering and brain science), kansei design intends to return to earlier Japanese philosophical or cultural works to rediscover the essence of kansei, and to use them as inspirational means for design. This new discipline certainly needs to be elaborated further. Therefore, this paper aims to contribute to the elaboration of a more expansive point-of-view in design research regarding the relationship between human beings and their immediate environment.

Keywords – History of Kansei, Kansei, Kansei Design, Kansei Engineering, Kansei Science.

Relevance to Design Practice – Next to kansei engineering, kansei design appears as a new design approach, finding inspirational means in Japanese philosophy.

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Introduction

Acknowledging the relevance of kansei engineering both in the industrial and the academic worlds, the current situation in the field of kansei research seems ready for the emancipation of other disciplines that are actually numerous and already significantly active. In this paper, the overview on how the literature describes kansei and kansei engineering points out the reason why other disciplines should expand in parallel to kansei engineering. Then tracing back the academic development of kansei throughout history, the theoretical structure for three domains directly related to the making of physical artifacts are described: kansei engineering (KE), kansei science (KS), and kansei design (KD). Whereas KE and KS have progressively emerged during the last decades, KD is introduced here as a new domain, re-exploring Japanese philosophy as an inspirational means to face current issues addressed by design research.

The purpose of this paper is to explore, mostly from a historical perspective, the notions of kansei and kansei research, in order to clarify and to open up new directions for kansei research, especially towards the discipline of kansei design.

Opening up Kansei Research

State-of-the-Art in Kansei Engineering

What is *kansei engineering*? Actually, what is *kansei*? These two questions are often asked in academic events where research in kansei engineering is exposed. For nearly four decades, KE has been developed as a productive research discipline, highly connected to the industrial world, claiming numerous innovations and market successes. The design of the Mazda Miata (also known as MX-5; Nagamachi, 1995a) is known to be the first and

probably the most famous project based on KE. Since then, many other large companies have used approaches developed by KE and have created successful products. Certainly, the car industry has led the development of KE (e.g., Mazda, Nissan, Ford, Saab, Volvo...), but many other industrial domains, such as textiles (e.g., Wacoal and Goldwin), foods (e.g., Nestle), electronics and home appliances (e.g., Sharp, Panasonic, Samsung, Electrolux...), cosmetics (e.g., Shiseido, Milbon), etc., have also used KE methods as an approach to create new products for their own market. As a recent and culminating event in the development of kansei engineering, the Japanese Ministry of Economy, Trade and Industry (METI) has declared kansei value as the fourth value axis for Japanese industry to “enhance people’s lifestyles and invigorate the economy” (METI, 2007). This new status for KE should be seen both as a recognition of the level of development and relevance which KE has already attained and as a new effort for the further development of KE. The same goes in the academic world: The Japan Society of Kansei Engineering (JSKE), created in 1998, gathers researchers from many disciplines such as information technology, textile engineering, robotics, food industry, management, business, etc. Also, the International Conference on Kansei Engineering and Emotion Research 2010, KEER 2010 (Lévy, Bouchard, Yamanaka, & Aoussat, 2010)

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gathered 234 presented papers from 25 different countries related to more than 13 different research disciplines (including affective computing, experience design, branding, and business). From this brief overview of current kansei research activities, the strength and the relevancy of KE in the engineering research landscape is evident. Over the years, the discipline of KE has been growing steadily, and is now recognized internationally.

Yet the two original questions remain: What is *kansei engineering*? And what is *kansei*? Despite the international recognition of KE in both the industrial and academic worlds, answers to these questions are often difficult to provide clearly. However, as we shall see, the literature provides valuable elements to answer these two questions.

Status Quo on Kansei Engineering

Concerning the first question, two valuable tentative answers (among others) proposed by Schütte, Eklund, Ishihara, and Nagamachi (2008) and Lokman (2010) together provide a clear understanding of what *kansei engineering* relates to. Inspired by the work of Nagamachi (1995a), Schütte explains kansei engineering directly, as a method to translate the (measured) kansei of users (also described as the “user’s *subjective impression*” by Schütte) into a design. This method involves a succession of steps (roughly: determining a domain, structuring a kansei space in which users’ kansei can be measured and analyzed, and interrelating product details or kansei elements—see Schütte, 2005, for more details). Therefore, kansei engineering is a method aiming at aligning design details in relation to a user’s kansei in order to determine and evaluate new design solutions. This considered, and as suggested by Nagamachi (2011), KE is often associated with affective engineering.

What is remarkable concerning kansei engineering is that the structure of the method remains consistent spatially (i.e., among various researchers or laboratories) or over time, yet the tools and the means used in kansei engineering are continuously progressing. Currently eight types of kansei engineering exist. Each type is characterized by a specific set of tools (e.g., fuzzy logic in type 3, virtual reality in type 5, or collaborative tools in types 6 and 7—see Lokman, 2010, for more details) which offer new possibilities for structuring the kansei space. Using a different approach, Lokman describes the specific qualities of KE by differentiating it from other consumer satisfaction evaluation

methods (namely, Quality Function Deployment [QFD], Conjoint Analysis, and Voice of Customer [VoC]). While these methods focus on the explicit needs of consumers, KE proposes to measure and to analyze consumers’ implicit needs and to associate them with product design characteristics. Then, referring to the work of Ishihara, Lokman focuses on the delicate issue of kansei measurement: “Since kansei is subjective, ambiguous and unstructured, it is impossible to measure it directly. Therefore, we need to devise indirect measurement methods by considering alternative forms of expression. Kansei measurement is classified into physiological measures and psychological measures.” (e.g., for physiological measures [Orero, Levillain, Damez-Fontaine, Rifqi, & Bouchon-Meunier, 2010], for psychological ones [Lee, Harada, & Stappers, 2002], and for psychophysiological ones [Lévy, Yamanaka, & Tomico, 2011]). KE will be explored further in the text.

Nevertheless, what is of note here is that, when being described in comparison with other engineering approaches, KE (the approach, its specificities and its challenges) can be described well without the need for a clear definition of kansei, and KE can be applied without directly measuring kansei. That is certainly the reason why, over the four decades of KE development, the second question has been less explored.

Status Quo on Kansei

In the literature, the second question has indeed attracted much less satisfying answers than the first one. Numerous attempts to explain what kansei is have been made, but these attempts mostly only occurred in the introductory part of research papers, or kansei was described only as one aspect of the scope of a paper’s research topic (e.g., a paper in psychology referring to kansei exclusively from a psychological point-of-view). Thus, kansei has been often translated as sensitivity, sensibility, feeling, customers’ feeling and need relating to a product, etc. (S. Ishihara, K. Ishihara, & Nagamachi, 1999; Kiyoki & Chen, 2009; Nagamachi, 1995b), and the translation was most of the time recognized as approximate by the author her/himself. Although certainly valuable for the paper they were included in, none of them stand out as a clear and comprehensive description of kansei. Deeper attempts have been made as well (other than cited here, see also Lee et al., 2002; Lokman, 2010; Nagasawa, 2004; Schütte, 2005): The first noteworthy attempt to define kansei was done by Harada (2003). He collected definitions of kansei proposed by sixty researchers in kansei engineering and analyzed their definitions statistically. Based on his analysis, he proposed to describe kansei as “an internal process (a high function) of the brain, involved in the construction of intuitive reaction to external stimuli.” During the same period, Nagamachi (2006) describes kansei as an “individual’s subjective impression from a certain artifact, environment, or situation using all the senses of sight, hearing, feeling, smell, taste as well as recognition.” While Harada describes kansei as a process, Nagamachi describes kansei as a result of this process. This difference can be explained by the inherent approximation in descriptions of kansei,

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which make the use of it approximate as well. Embracing this ambiguity, and based on the synthesis of a larger set of definition attempts, a compound description of kansei has been proposed (Lévy, Lee, & Yamanaka, 2007):

- Kansei process gathers all the sensory qualities functions, including interactions between them (Clark, 1993).
- Kansei means are all the senses and other factors such as personality, mood, and memory.
- Kansei result is the fruit of kansei process. It appears to be a unified perception providing a qualitative meaning and value of one's environment. It is the synthesis of sensory qualities.

This final description helps further our understanding of what kansei is related with, but still appears as an approximate description. Although the descriptions cited previously contribute to a better understanding of what kansei is about or what kansei relates to, a clearer description, and a more constructive one for the field of kansei research, should be found in the future.

Discussion

These descriptions answer to a great extent the starting questions. Nevertheless, they appear not to cover all the topics in kansei research, and they do not precisely take into account the various ways kansei is approached in different domains. These different domains have been briefly and non-exhaustively mentioned by Shimizu et al. (2004) and described as the “regions of kansei engineering”: kansei philosophy, kansei sociology, kansei culture, kansei design, kansei business, kansei information, and so on. However, although the list provides a good starting point to further explore the field of kansei research, the author disagrees with this denomination as it is epistemologically highly disputable to consider kansei philosophy or kansei sociology as a part of KE. KE is part of a larger field, kansei research, which includes kansei science, kansei design, or kansei sociology as well. Two clear examples of research that are not included in KE are the development of kansei science (Harada, 2003) and the sociological approach to kansei (Takeda, 2006), which have different objectives and a different take on kansei than KE. Kansei science is described as a trans-disciplinary science, and is approached at the University of Tsukuba by a collaboration between brain science, cognitive science, disability science, and kansei information science (which is actually an information design science laboratory), all focusing on indirectly measuring and characterizing kansei and related cognitive processes and behaviors (Lévy et al., 2011). The second example takes a sociological standpoint on kansei studies and shows how sociological methods can be involved in this field. These two examples show that kansei research is not limited to KE, and that despite the clear dominance of KE, much remains to be explored, structured and described in the field of kansei research.

Because the reduction of a great variety of approaches in kansei research to KE is now apparent, the aim of this paper is to undo this reduction and to propose a global form of kansei research, in which many research domains meet on the topic of kansei. To address this intention, we propose first to introduce

kansei research from a historical approach. As it is detailed later, the first academic appearance of the term *kansei* occurred in 1878, whereas *kansei engineering* was mentioned first in 1986. Therefore, it seems valuable to explore how kansei was considered and developed before the actual emergence of KE. Thereafter, the structure of three domains directly related to the making of physical artifacts are described: kansei engineering (KE), kansei science (KS), and kansei design (KD). We acknowledge here that the reflection provided in this paper may not render the entire field of kansei research, as for example the sociological approach on kansei may not fit in. However, the intention here is to propose a starting point for a greater and more explicit look at kansei-related research domains other than KE.

The Early Age of Kansei

The Early Time of Kansei: *Early-Modern Literature*

The appearance of the term kansei in Japanese literature goes back at least to the 17th century, a period of great development of the literature of Japan, especially for poetic styles (Shirane, 2008). *Nanshoku masukagami* (lucid mirror of nanshoku), presumably written by Yoshida in 1687 (Yoshida, 1687/1950), is often presented as one of the first Japanese works in which the term kansei appeared in printed matter. In this work, *waka* (Japanese poem) is described as follows: “A piece of *waka* makes your heart abate and kansei, which is a virtue of *waka*” (Nagasawa, 2004).

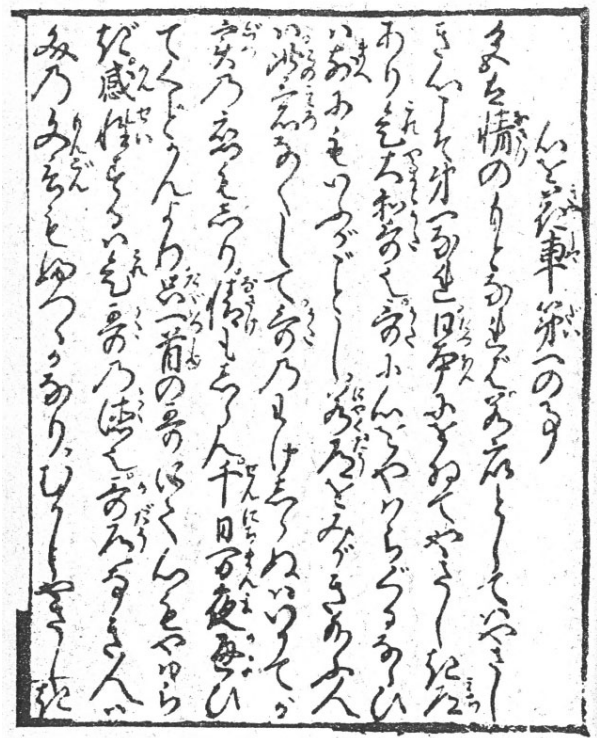


Figure 1. Extract of the *nanshoku masukagami* (Yoshida, 1687/1950). The term *kansei* can be found at the second column starting from left (second and third characters from the top).

Introduction of Kansei in the Academia: Philosophy and Psychology

The characterization of kansei as an academic term occurred in 1878. The Meiji era (1868–1912) is the period when Japan re-opened to the world, especially towards European culture, both in operating mode, and in academia. Amane Nishi was sent in 1862 to study at Leiden University in the Netherlands (Piovesana & Yamawaki, 1997). During his stay in 1865, he studied many topics such as Law, Psychology, and Philosophy, about which he took extensive notes (Nishi, n.d./1981).



Figure 2. *Bunkyo nenkan Oranda ryugakusei ikko no shashin* [Photograph]. (1865). Retrieved November 15, 2012, from <http://dl.ndl.go.jp/info:ndljp/pid/3851065>. Copyright 2011 National Diet Library. Reprinted with permission. - Photograph of the first Japanese students who came to study at Leiden University, the Netherlands. Amane Nishi is on the first line, on the right side.

Among many others, he studied the German philosopher Alexander Gottlieb Baumgarten's work on Aesthetics (Baumgarten, 1750). In his notes (Nishi, n.d./1981), Nishi transcribed some key terms from Baumgarten's works (among which are: know, act, feel, intellect, will, sensibility, true, good, and beauty) and proposed a Japanese equivalent (respectively 知 *chi*, 行 *gyou*, 感 *kan*, 智 *chi*, 意 *i*, 思 *shi*, 真 *shin*, 善 *zen*, 美 *bi*). The association between "feel" and "kan" happens at this time and will be used later, as Nishi proposed the term *kansei* to translate sensitivity in 1878 during his translation work of Joseph Haven's *Mental philosophy: including the intellect, sensibilities, and will* (Haven, 1857; Nishikawa, 1995). In this translated work, entitled "shinrigaku" (meaning "psychology" in Japanese, a term also coined by Nishi, 1875/1961), Nishi uses *kansei* to translate sensibility, also described as "the faculty of feeling" (Haven, 1857). Thereby, when considering Nishi's note, it appears that his construction of the term *kansei* seems to be a literal translation of "faculty of feeling" (kan—感—standing for "feeling", and sei—性—standing for the human "faculty"). The term was coined by Nishi, but was not worked on further by him.

Note that the literature also explains the construction of the term *kansei* from a lexicographical point of view, as a short form of *kanjusei*, i.e., sensibility in Japanese (Kitahara, et al., 2001).

However, from the historical point of view taken in this paper, the first explanation appears more insightful in helping us understand the origin of kansei and its meaning in kansei research.

The term *kansei* appears later again in a philosophical work, the Japanese translation of Kant's *Critique of the pure reason*, done by Teiyu Amano in 1930 (Kant, 1979). In this translation, Amano translates "Sinnlichkeit" into *kansei*. *Sinnlichkeit* is described by Kant as the faculty of intuitions, perception, and mental imagery. Intuitions are object-directed representations that are singular, sense-related, object-dependent, immediate or directly referential, and non-conceptual (Hanna, 2009). Although the proximity between the two terms is obvious, and therefore often used in the literature to explain *kansei*, this proximity has not been developed further. This distance between the Japanese philosophy related to *kansei* and Kantianism is significantly marked by a series of critical studies done by the School of Kyoto on Kantianism, especially those relating to the topics of self and representation (Wilkinson, 2009, p. 137).

Kitaro Nishida

As father of the philosophical School of Kyoto, Kitaro Nishida is one of the most influential philosophers in modern Japan. Although Nishida did not directly focus on the notion of *kansei*, his work is immensely influential in Japanese philosophy, and has crucial implications in the understanding of *kansei*. Among others, he contributed terms such as *action-intuition* (where intuiting entails acting, and acting intuiting. Both the world and the subject are formed mutually and are reflected in one another [Maraldo, 2010]), *pure experience* (which describes the primal undifferentiated form that subsequently dirempts into differentiated forms including: experiencing subject and experienced objects, intellectual intuition and reflective thought, objectified nature and objectifying spirit—all on their way to a higher unity [Maraldo, 2010]), and *basho* (the place where individuals are located in terms of their substance and attributes. This *basho* is not the world of actual, concrete beings but an initial and partial reflection that abstracts part of that world so that it can become intelligible [Heisig, 2010]), and appear obviously to be constitutive of the Japanese approach on *kansei*, as well as on perception, on experience, and on context.

The notions introduced by Nishida can be considered parallel to Merleau-Ponty's phenomenology of perception (Merleau-Ponty, 1945/1967), which also focuses on the primacy of perception. The relationship between the concept of a phenomenology of perception and the School of Kyoto is indeed strong, first historically (Nishida is often considered to be the introducer of phenomenology in Japan), but philosophically as well, as they share numerous philosophical positions, notably concerning pre-reflective experience (Kopf, 2001, p. xix). "Over time I came to realize that it is not that experience exists because there is an individual, but that an individual exists because there is experience" (Nishida, 1992, p. xxx).

Intermission

In the early period of the twentieth century, although the term *kansei* appears here and there, e.g., in Kamei Hideo's work on Japanese literary criticism *kansei no henkaku* (translated in English as *Transformation of the sensibilities: The phenomenology of Meiji literature* [Kamei & Bourdaghs, 2001]), the term does not undergo any noticeable change or highlight. This long period, mostly characterized by intense political and military activities in East Asia, did certainly not favor any academic work on *kansei*-related topics.

The Industrial Age of Kansei

Marketing

The term *kansei* reappears in the discipline of marketing in 1984/85, with the publication of two books (Dentsu, 1985; Fujioka, 1984) by the Dentsu company. These two books argue that a shift was occurring in consumers' behavior in Japan. Indeed during the eighties, in an invigorated yet still developing Japanese market, a change of behavior was being observed: Expected and "logical" behavior appeared progressively to be giving way to provide room for a more unpredictable and *kansei*-like behavior. Because of this shift in behavior, the market had to change, moving away from mass production planned for everybody, to an adaptive mass-production responsive to each consumer's tastes and wishes.

This step was a major one regarding activities related to *kansei*. It is indeed at this time that *kansei* made a step outside of the academic world, to enter the worlds of industry and society. The industrial and social actors in Japanese society pointed out the evolution that was taking place in the society and brought more and more interest to the notions related to *kansei* and human being's feelings. It is not surprising then to observe the great and rapid development of *kansei* engineering in the eighties, followed by *kansei* science soon after. The rest of this paper focuses on the development and the structure of these two disciplines, and introduces *kansei* design which has a distinctive approach and viewpoint compared to former approaches to design.

Kansei Engineering

The first, and probably the most important impact on the industrial world, was formulated by Nagamachi, a professor at Hiroshima University. He is considered to be the father of KE. The term *kansei engineering* itself was used for the first time in 1986 by Yamamoto (1986), president of Mazda Automotive Corporation, at Michigan University. It is often said that KE was first involved in the design of the Mazda Miata (also known as the MX-5). In an early appraisal (Long, 2007), describing the project which would end up with the creation of the MX-5, a paragraph clearly expresses early *kansei*-related considerations:

Sports cars must have a degree of performance, but more importantly, they must be fun to drive. A low-cost sports car doesn't need 0.81g lateral acceleration or 0-60 in 8.5 seconds. It has to, as one journalist succinctly put it, "feel faster than it is, but

it doesn't have to be fast in absolute terms." Of course, a sports car mustn't be a sluggard either, so it is classic example of searching for the happy medium (p. 18).

This quote introduces the intention of KE well, i.e., why *kansei* is associated with this engineering approach. Whereas classic car engineering would focus mostly on manufacturing ability, performance, and usability, KE (especially the Type I) initiates its process based on providing the user with a targeted impression and then processing the entire project around this intention. In the case of the Mazda Miata, this impression was described as Human Machine Unity (HMU): "This concept implies that a driver feels a unification between himself or herself and the car when driving. The driver feels that his or her body might be the car and controls the machine with his or her own intention freely" (Nagamachi, 1995a, pp. 4-5). Starting from these considerations, the KE approach was structured to support an entire process focused on achieving a final outcome (the car) which allows the driver to experience such a unity.

We can see from this that KE is part of a family of engineering methods aiming at translating user's feelings into concrete product parameters. As explained by Schütte (Schütte, Eklund, Axelsson, & Nagamachi, 2004), "KE does not develop new theories or tools in the different areas at all. Rather, it is an all-embracing methodology containing rules for how different tools can interact with each other in order to quantify the impact a certain product trait has on the users' perception" (p. 216). Tools come from other fields of research (mathematics, computer science, psychology...) and are collected and organized for the purpose of KE. Even though the structure of KE remains stable, KE can evolve greatly when the tools involved in the method change.

Accordingly, KE can be described as embracing a systemic approach based on a reductionist method. The engineering quality of the method is of course fully justified. Moreover, the KE structure, being mostly a skeleton on which various tools and technologies can be connected, explains not only why this method has been able to evolve wisely over time, but also why it has been claimed not only in the discipline of product engineering, but also in marketing and robotics. KE is defined by a structure and a purpose; tools and technologies follow.

However, as KE is described here, *kansei* qualities themselves are disregarded throughout the process of KE. The objectification of the data and their explicit definition in the third person, which is required in an engineering approach, seems to contradict the subjective and pre-predicative qualities of *kansei*. Therefore, it is argued here that although the origin of KE was greatly inspired by *kansei* considerations, KE does not itself aim at directly correlating user's *kansei* with design details. Rather, KE establishes a correlation between users' *expressed impressions* and design details. And it has done so successfully.

Kansei Science

During the same period, the preliminary works which led to *kansei* science (KS) were done by Harada. As KE represents a meeting between *kansei* and engineering, KS represents a meeting point between *kansei* and cognitive science. The research initiated in the

eighties by Harada aimed at describing users' cognitive processes related to preferences and choices of products from a holistic perspective. As this research grew, Harada gathered various fields of research (information science, robotics, cognitive science, and design) at the University of Tsukuba to create a 5-year research project named "Modeling of Kansei Evaluation Structure" (Harada, 2003). Using a remote robot in a museum context, he could explore, describe, and characterize visitors' behaviors and cognitive processes related to art appreciation. Extensive findings were published in a series of 5 books *Kansei evaluations n.1-5*. In 1998, the recognition of "kansei engineering" as a discipline by the Japanese Ministry of Education, Culture Science and Technology (MEXT), enabled the creation of kansei-related departments in Japanese universities. In 2001 the University of Tsukuba started a trans-disciplinary major comprised of Kansei, Behavioral and Brain Sciences, including a doctoral degree in kansei science. In 2003, a 5-year academic program funded by the government led to the creation of a Centre of Excellence dedicated to the "Promotion of kansei science for understanding the mechanism of mind and heart." This Centre of Excellence produced many major scientific findings, thanks to the fact that stronger links were built between psychophysiology and design (Lévy et al., 2011).

KS is therefore built on brain science, mostly cognitive neuroscience and psychophysiology, and relies on related philosophies. The mind/brain identity theory (Smart, 2011) is, for example, used extensively in KS. Human's thinking and resulting behaviors can be best understood by using a model involving mental representational structures and the mental procedures

that operate on these structures (Thagard, 2011). These models and structures can be studied by psychophysiological approaches (Yagi, 2000, p. 364).

In this academic and philosophical context, KS has aimed to characterize and to evaluate emotional experiences and creativity, to contribute to a better understanding of the mind based on knowledge derived from physiological and psychological approaches. Moreover, KS has very often worked with design research to conjointly develop new methods for design and communication (Lévy et al., 2011). An example of this method is illustrated by Figure 3 (see Tomico et al., 2006, for details). From psychophysiological measures (using the "HSK centre rhythm monitor device" [Yoshida, 2002]—photo 1) and repertory grid technique: RGT (Tomico, Karapanos, Lévy, Mizutani, & Yamanaka, 2009, based on Kelly's, 1963, Personal Construct Theory—photos 2 and 3), a user's behavior and mental model towards the evaluation of pens can be captured. The captured information is then structured and presented (photo 4) to become usable as an inspirational material for future pen designs (photos 5 to 9). Therefore, based on these kansei science approaches and properly transferred for design purposes, a designer can gather a great set of knowledge directly extracted from the user's experience. This greatly reduces the subjective influence the scientist may have on the expression of the user's experience. Thanks to the way this set is structured, the designer can fully profit directly from the user experience to get new inspirational matter for use in design.

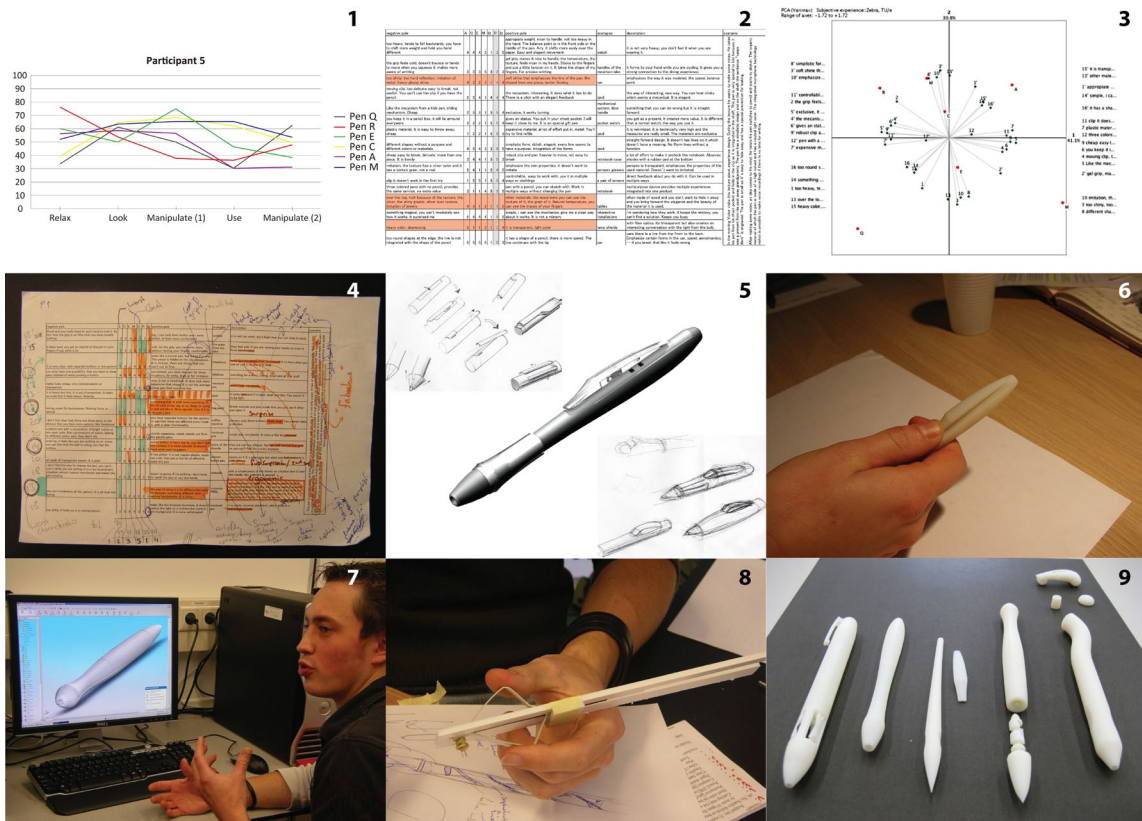


Figure 3. Kansei science implication for design, an example (Lévy et al., 2007).

The scope of industrial domains that KS is applied to is quite broad: KS can be applied to all topics benefiting from the use of knowledge output relating to the scientific characterization of human perception and behavior. The most frequent and influential instances in the literature concern the textile industry (e.g., sensory qualities of fabrics [Schacher, Bensaid, El-Ghezal Jeguirim, & Adolphe, 2011], visual perception of the tactile properties of fabrics [Xue, Zeng, Koehl, Dupont, & Chen, 2012], the comfort of apparels [Kamijo & Shimizu, 2012]), the food industry (e.g., consistency between packaging perception and taste [Mizutani, Okamoto, Yamaguchi, Dan, & Yamanaka, 2010], taste characterization of aliments and beverages [Yoto, Sato, & Yokogoshi, 2012]), the automotive industry (e.g., appreciation and preferences of visual aspects [Kim, Cho, Niki, & Yamanaka, 2012] and comfort in driving [Zhang, Lei, Harada, & Yamanaka, 2006]). All these research projects share a common consideration of human perception and behavior, taken through the filter of either a psychophysiological or a cognitivist perspective. From these perspectives, while KE is associated with affective engineering, KS can be associated with sensory science (e.g., Bakalar, 2012).

Kansei Design

Kansei design (KD) is introduced in this paper as a new discipline in the kansei research field. KE literature has often used the term *kansei design* to characterize KE works which produce actual industrial products as their output. However, in the light of this paper, it is clear that these works are within the realm of KE, because they are bonded to an engineering approach, as opposed to KD which, as introduced in this paper, is yet another approach.

KD projects can be split into two groups based on their main foci. The first group focuses on the physical materiality of artifacts (i.e., their intrinsic properties), and their evaluation or preference by the user. This group of projects is very close to KS in terms of domains of application (i.e., in textile design [Otomo & Yamanaka, 2012; Yahaya 2012], and in automotive design [Kushi, Kitani, & Fujito, 2005]), but differs in its attitudes towards ambiguity and uncertainty. KS tries to avoid ambiguity and uncertainty or tries to “solve” it by means of logical reasoning, while KD deals with ambiguity and uncertainty by means of design skills.

The second group, which this paper is considered to be part of, focuses on the interactive materiality (Stienstra, Alonso, Wensveen, & Kuenen, 2012) of artifacts (i.e., the qualities of the artifact in interaction). Complementary to the KD approach presented thereafter, the attempt developed by Toyota Motor Europe (TME) constructs an upstream phase integrated to the early design process phases of the company (Gentner, Bouchard, Aoussat, & Esquivel Elizondo, 2012a; Gentner, Bouchard, Esquivel Elizondo, & Favart, 2012b).

KD at Toyota Motor Europe

KD was initially described as the way to introduce kansei engineering approaches into the scope of design thinking (as described by Gero, 2010). The aim was to determine the design space (understanding), create propositions fitting in this space

(creating) and to assess propositions based on users’ kansei (assessing). TME uses KE techniques for assessing, but has come to recognize the need for a design approach in the two first parts: understanding and creating, i.e., the need for a KD approach to create a *kansei space*. The KD approach developed by TME aims at bringing users’ experience earlier into the creation of the design space.

Anecdotally, it is interesting to notice that this approach is the result of an initiative and of an effort made on the European site of a worldwide Japanese company. The advent of KD as proposed by TME would provide a clear example of the significant involvement which Europe is having on the field of kansei research.

Kansei design as a new approach for the field of kansei research

Whereas KE and KS have found their roots in scientifically established approaches (respectively engineering and brain science), KD intends to return to earlier philosophical or cultural works related to kansei, and to use them as inspirational means for design. Therefore, KD explores Nishida’s philosophy (more accurately the philosophy of the School of Kyoto and of other related schools) as a source of knowledge and opportunities to be handled by design. Moreover, kansei design embraces the stance of design, as a guide about what we do, where we go, and what strikes our eyes: KD is about people, about our beliefs and our dreams, about beauty and society. It is about being in the world (Overbeeke, 2007), just as kansei is as well.

Being inspired by Nishida’s work, there is a primacy of action: “We see a thing by action, and the thing we see determines us as much as we determine the thing. That is action-intuition” (Nishida, 1952/1987, p. 131). There is a primacy of the body “Just as the body of an artist is the organ of art, so is the body of a scholar the organ of scholarship; the life of an artist exists in beauty and that of a scholar in truth. Even the activity of thinking does not exist separately from our physical body” (p. 174). This is the point from where kansei should be explored in design. Kansei designers should explore kansei through action, and then reflect upon action. Considering that a similar stance has been taken by western philosophy inspired design approaches (Djajadiningrat, Wensveen, Frens, & Overbeeke, 2004; Overbeeke, 2007), KD does not start from scratch, but can be associated with compatible ideas at an international and philosophically intercultural level.

With its roots in Japanese culture, KD takes the Japanese tradition for craftsmanship into highest consideration (Sennett, 2008; Yanagi, 1989) and reaches end users through the relationship between craftsmen and their artifacts. The stance of an artifact is not revealed only by the experience of the users. It also acquires meaning through the intentionality of the designer. This is how kansei should be explored in the design process, incorporating all the varieties of points of view held by designer and users.

From an ethical perspective, KD should aim at proposing new points-of-view, proposing what we are seeking, and the direction we should follow. Our aim is to focus on subjectivity, because subjectivity leaves room for creativity and change, for dynamism, for permanent challenges and opportunities, for

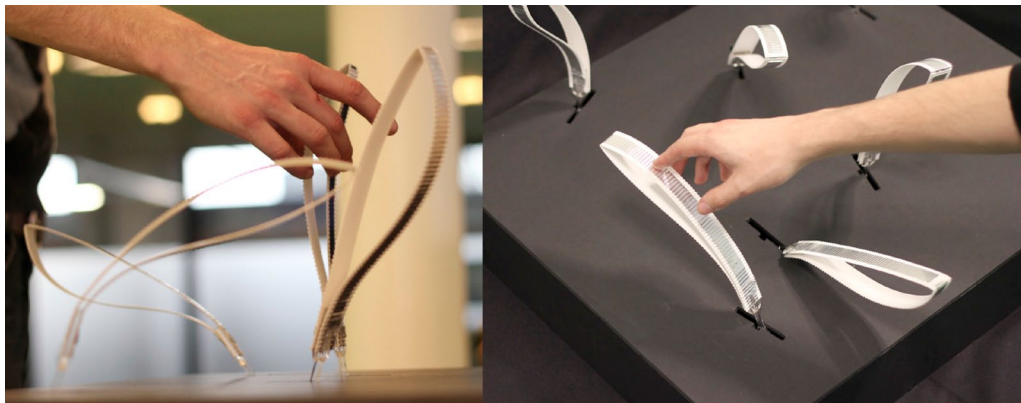


Figure 4. Be Touched!

imagination and dreams. Subjectivity favors possibilities over optimization, engagement over efficiency, utopian motivation over feasible goals, what makes one moves over what makes one achieves. This implies that in KD we must shift our point-of-view to consider the description of the dynamics of the situation instead of the definition of the situation itself. This is why kansei should be explored by design.

Projects in kansei design

As a conclusion to the description of KD, two different types of kansei design projects are introduced here. The first, the sensual dynamics artifact, BeTouched!, is an explorative design project. The second, Ohlala, is a Research-through-Design project (Frayling, 1993; Koskinen, Zimmerman, Binder, Redstrom, & Wensveen, 2011), focusing on a new dimension for telepresence devices. It is to be acknowledged that the designs introduced here are quite explorative, and do not yet aim at attaining the status of marketable products. However, the implication of kansei considerations can be seen clearly, and these projects show what kansei can bring to design.

A sensual dynamics artifact is described as an artifact which is able to sense a person and to behave so as to invite reciprocal movements which enhance perceptive experience. Such an artifact is therefore an object of experience and at the same time can trigger a greater sensory experience. BeTouched! is an exemplary sensual dynamics artifact. The exploration undertaken by the BeTouched! project is on the reciprocal touch: How can the fact that ‘I am touched by what I touch’ be a source of inspiration for sensual dynamics? From a series of iterations, demanded by the Reflective Transformative Design Process (Hummels & Frens, 2009), several design notions have been pointed out and explored further: embodiment, invitation, and subtleness (Lévy, Deckers, & Restrepo, 2012). One of the most valuable findings to result from the BeTouched! project is the notion of “embodiment”, which relates to the direct coupling between the moving body and the sensors. This encourages the designer to focus not only on the movement of the body in interaction, but also on the movement of the sensors in interaction. Similar to a cat which arches its back while being caressed, the dynamic qualities of the sensors greatly influence qualities of interaction.

From a research perspective, the Ohlala project (Lévy, Kuenen, Overbeeke, Uchiyama, & Yamanaka, 2011) is an example of research through kansei design. From observations of Cololo in use (a 1-bit communication device proposed by Ogaki, Suzuki, Hoshikawa, & Uchiyama, 2008), it has been shown that content is not necessary to trigger an emotional experience. Based on this finding, the Ohlala framework has been built to explore a novel dimension to be taken into consideration in communication technology: the content-completeness dimension. In this on-going Research-through-Design project, we intend to explore further the relations between this new communication dimension and emotional experience.



Figure 5. Picture of Cololo project (Ogaki et al., 2008).

Kansei from a kansei design perspective

As KD has now been introduced, what is kansei from the KD point-of-view? First, it is to be acknowledged here that KD’s body of knowledge is still very young and its fundamentals are still being elaborated. Attempting to claim a robust and possibly commonly acceptable description here would appear to be presumptuous. Instead, the intention is to express a first proposition, to make an attempt which can be discussed further by kansei researchers and designers, and to provide ideas that can be re-modeled as a result of the sharing of points-of-view among kansei designers.

The previously described notion of active-intuition (*koiteki chokkan* in Japanese—to be put in parallel with active perception) implies a mutual influence between the world and the individual. As Wilkinson (2009) explains: “We must experience the world in order to act on it. Just as he [*Nishida*] insists that practical reason is more profound than the theoretical, so he insists that our natural mode of being-in-the-world (Heidegger, 1962) is not contemplative but active, an aspect of constant mutual interaction between individual and world” (p. 120).

This constant mutual interaction between the individual and the world is essential, and ineluctable. Moreover, it is the primacy of an experience: the experience of being in the world. In other words, there is a difference between experiencing what is happening in the world and experiencing being in the world. The former relies on the meaning constituted from perceptive activity; the latter is simply based on the fact of being there. What interests us in this paper is the latter: The experience I have of being in the world, and how this affects me. To conclude, *kansei* is described here as the experience of the “being-in-the-world” and of its ineluctability.

Conclusion

In all the academic and industrial events organized around *kansei* research, the variety of disciplines involved has always been seen as a strength and as a beauty of the *kansei* research community. The variety of approaches and of languages interacting with each other may sometimes seem cacophonous, but this variety can also be seen as a constructive aspect of the field. It is necessary to share multiple points-of-view if we wish to embrace the world of *kansei*.

In this paper, although we underlined the great variety of the research disciplines related to *kansei*, and claim that *kansei* research should not be reduced exclusively to the discipline of *kansei* engineering (as is often done in the literature), no general pattern of *kansei* research has been proposed. On the contrary, we have explored three different approaches, which find applications in the making of artifacts, and pointed out their philosophical and methodological differences. Moreover, it is expected that in the close future other *kansei* research disciplines will reflect on their own approach and present to the community their specific qualities and their points-of-view on *kansei*. This attitude, coupled with the permanent desire to share their approaches among multiple points-of-views, will, we hope, serve as a meaningful effort towards furthering the development of *kansei* research and towards a greater recognition of the field internationally.

Finally, we have proposed in this paper the bloom of a new design approach, *kansei* design, inspired by Japanese philosophy and culture, founded on a non-reductionist point of view, which can be used both to focus on and to comprehend the phenomena of perception and experience (inherently contextualized). Much is to be done, but we expect that this approach will support the advent of a new point-of-view on the world. By refocusing on the central relationship between human beings and the world around them, we hope to generate greater energies for dynamism, and more opportunity for creativity.

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