

# Flow Kansei Engineering

Qualifying conscious and unconscious behavior to gain optimal experience in Kansei Engineering

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## Abstract

The general tendency of design is that being based on human and the aim of Kansei engineering is to follow the structure of emotions based on human behaviors. As we know, Kansei appears in individual emotions and is able to create different feelings in human mind (Nagamachi, 2010) where Flow is a teleonomy of the self (Csikzentmihaly, 1992). However, Design has a convergent and divergent relation with needs and desires. Accordingly, designers are obliged to meet user's desires but the implicit needs of such an emotional experience are difficult, partly because people express their emotions both consciously and unconsciously. Analyzing the relationship between Kansei and Flow, activities can have optimal behavior output. This article provides a new approach, which can be applied to capture the emotions of users and proposes a new framework of Kansei Engineering (KE) to handle the optimal experience of people besides their needs in a various tangible fields such as interior and product design. In this study we use the KE Model of Schütte because it is understandable and compatible with new tools. We use Flow in semantic and properties space and we created a Flow space during the synthesis step of this level.

**Keywords:** Kansei Engineering, Flow, Optimal Experience, Product Design, Neuroscience, Positive Psychology, Healthcare Design

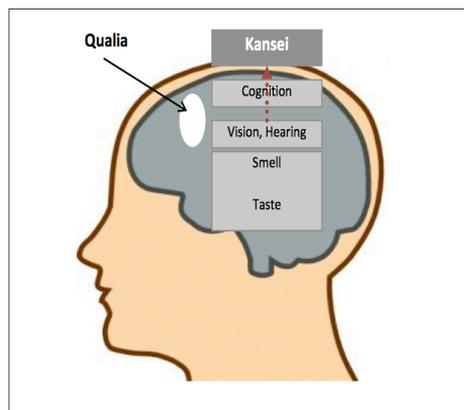
## 1. INTRODUCTION

Happiness is one of the central concepts in positive psychology (Seligman, 2003; Seligman and Csikszentmihalyi, 2000). Finding the quality of emotion in happiness, designing for happiness, and measuring emotion of satisfied users are all steps capable of increasing the quality of life. These are interesting issues, which are considered both in market and customer satisfaction. Nowadays,

several methods have been created based on emotional design. One of them is Kansei Engineering.

What is Kansei?

Kansei is an unconditional mental function, and more accurate as being a higher function of the brain (Harada, 1998). Psychological phase of Kansei is an outcome through cognition and the five senses. Figure 1 shows the process of Kansei and the five senses within the structure of the brain (Lokman, 2010).



**Figure 1: The Process of Kansei (Nagamachi & Lokman, 2009).**

What is Kansei Engineering?

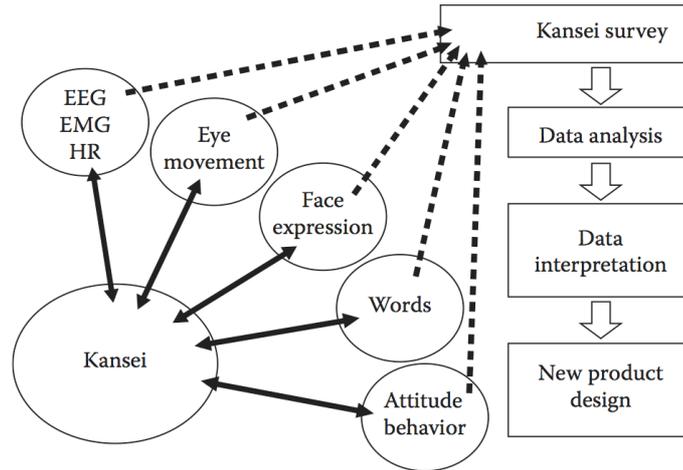
Kansei engineering (KE) is a technology that integrates Kansei (feelings and emotions) with the engineering methodologies. It is a field in which the development of products that deliver happiness and satisfaction to users is conducted technologically, by analyzing human emotions and incorporating them into product design (Nagamachi, Lokman; 2009).

KE and design projects

Many Japanese companies have used KE method. Mazda used Kansei Engineering in the development of Miyata model, Sharp LCD display instead of a conventional ocular and Wacol to design underwear are some companies which used KE to increased the their sale.( Schütte,2004)

Measuring Kansei

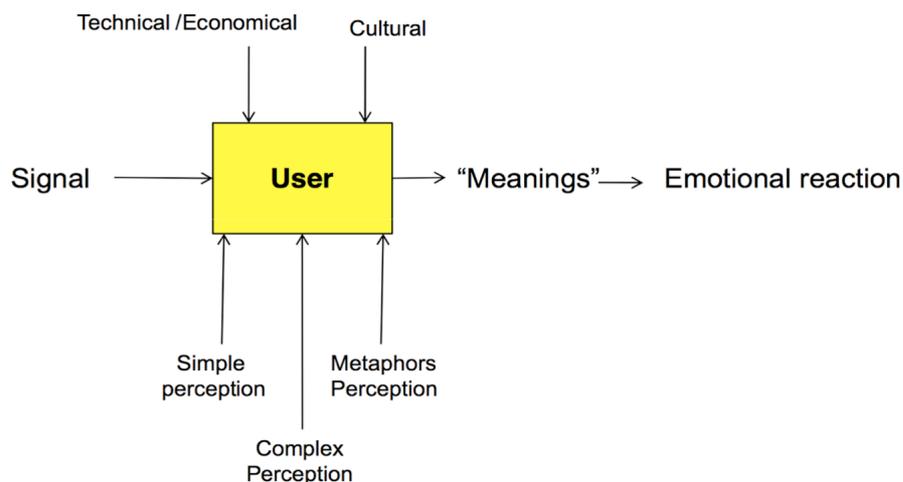
Figure 2 depicts existing approaches of measuring Kansei. In addition, KE in all eight types (**KE type I** : Category classification, **KE type II**: KE system, **KE type III**: KE Modeling, **KE type IV**: Hybrid KE, **KE type V**: Virtual KE, **KE type VI**: Collaborative KE, **KE Type VII**: Concurrent KE ,**KE Type VIII**: Rough Set KE) (Nagamachi, 2003; Ishihara et al., 2005) measures people's emotion in current mood without any effort to improve their feelings.



**Figure 2: Choices of route to reach the Kansei (Lokman and Nagamachi, 2009).**

Where does the Emotional reaction come from?

We can anticipate people’s emotional reactions by knowing how input signals are affecting them. According to Marco Maiocchi (M. Pillan, M. Maiocchi and M. Radeta, 2013), below is depicted the process of meaning and emotions felt by users from every signal. Figure 3 demonstrates how users generate meaning emotional reaction of signals by simple and complex perceptions within technical and cultural constraints. Variety of interpretation, memory, judgment is justifiable by this model. Furthermore, we believe that people are constantly affected by environmental signals, which have an ability to affect and change their perception.



**Figure 3: The process of meaning from signals (Pilan, 2013)**

How can we affect the user's emotional reactions?

The amount of skills and challenges are forming the user's emotional reaction. As presented in Figure 4, Flow is a function of counterbalance between challenge level and skill level when both are above average level for the individual in that, low skill and high challenge generates anxiety and high skill level and low challenge level result in relaxation. Flow helps people to overcome problems and to bring exhilarating feeling of transcendence into their lives (Csikszentmihaly; 2013). Entering Flow depends on developing a balance between perceiving activities, capabilities and opportunities (Nakamura, 2002). In addition, attention plays a key role in entering and staying in Flow mode. Remaining in Flow mode can only be guaranteed by keeping the balance between skills and challenges. The duration of remaining in Flow mode is the most widely used system for measuring the autotelic personality (Nakamura, 2002).

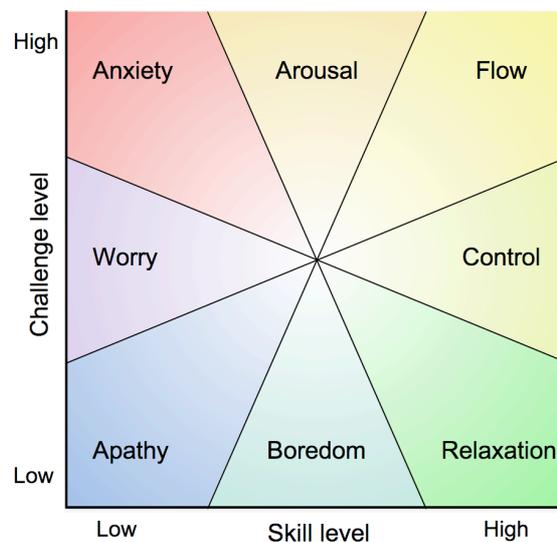


Figure 4: Csikszentmihalyi's Flow mode ( Mihaly, 1997)

According to Csikszentmihaly the joy of movements such as dance, exercise, Yoga, sex, listening to music, tasting and hundreds of separate functions do correspond to Flow experience (Csikszentmihaly, 2002). He believes that joy of thinking, working, enjoying solitude and being with other people, communication and creativity have the ability to enter people into Flow mode.

#### Measuring Flow

Flow is a subjective state based on self-report interviews, paper-and-pencil measures, Flow Questionnaires and the Experience Sampling Method (ESM) (Delle Fave and Massimini, 2004; Jackson and Marsh, 1996).

#### Flow and design projects

Several art museums have integrated Flow principles during their exhibitions design and buildings, including the Getty Museum in Los Angeles. Flow principles have informed product design, at Nissan USA, for example, with the goal of making the use of the product more enjoyable (Nakamura, 2002).

### Entering Flow in KE process

We believe that the customer's point of view is not enough considered to achieve satisfaction in new design. Doing the KE test while the participants who are in their Flow mode, can lead us to new design based on people's happiness. Being in a good mood and using user's skills to make a deep challenge with products provide an appropriate status in achieving better results. In order to get a valuable result besides entering the participants in their Flow mode, we need to keep them in that condition. Measure Kansei of users during their flow by all aforementioned measures of Kansei and Semantic Differential Method (SD) developed by (Osgood et al. 1969) are available to assist us in this evaluation.

## 2. PROPOSING A FRAMEWORK OF FLOW KANSEI ENGINEERING (FKE) BASED ON SCHÜTTE KE MODEL

KE type I is the simplest and quickest one to try for this new model. We choose KE model proposed by Schütte. As we can observe from Figure 5, this model has a 6-steps process and was used in our previous study to link the product's emotions with product's properties (Shafieyoun, Koleini Mamaghani and Jahanbakhsh, 2010). Shütte anticipated that the "future growth of Kansei Engineering and the application of new areas make it necessary to allow the integration of more tools and methods from other areas" (Schütte, 2004).

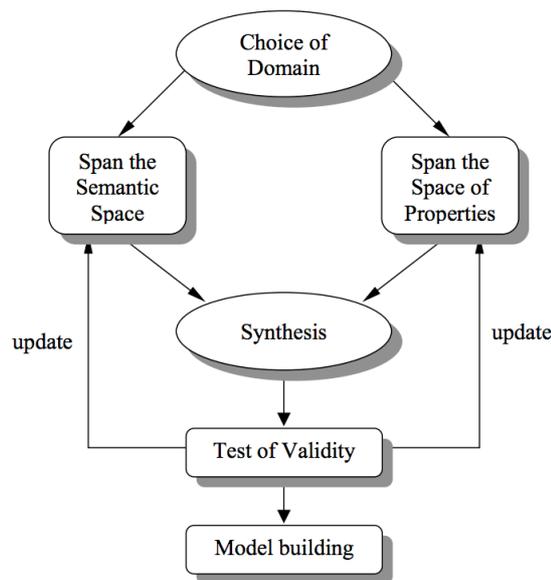


Figure 5: KE model proposed by Schütte (2005).

We choose this model and merged it with the Flow concept. We describe the new approach of KE based on above stated literature reviews and link it with Flow concept to form a new measuring system called Flow Kansei Engineering (in future, FKE).

**2.1 Choice of Domain:** The choice of a target group is informed by the market and the particular new product. Measuring Flow helps us to know our user better and make a better consequently results in developing a more suitable Kansei word (KW) collection. We also need to measure flow in order to choose the optimal way to enter our users in the Flow. The results of qualitative interview help us to prepare a questionnaire based on the keywords such as whether, how often, in

what specific activity and context. The goal is to compose a picture of the typical subjective experience when things are going well. We can create a questionnaire depending on our research goals to use ESM. ESM helps to change a complex subject to simple one and gain more results about the condition of individual Flow. During measuring Flow we can gain a lot of KW.

**2.2 Spanning the Semantic Space:** Kansei measure is a part of this step to collect KW. We measure Kansei alongside with measuring Flow. We know about the interest of users and we find how we can enter them in Flow mode. Being in Flow can change the result of Kansei measure for users, which is reflected in their physiological responses, behaviors and actions, and facial and body expressions and words. When Shütte introduced this method he mentioned, “Unfortunately, all the presently available measuring methods are external methods interpreting different body expressions”. Applying Flow concept we might grasp and measure Kansei and develop interpretations of customer’s emotions. SD Method is the best solution to gain metric parameters during this process.

In order to collect KW, we use magazines, literature, results of measuring Flow, ideas, Internet as well as the result of Kansei measures and further observation. Word reduction can be done by factor analysis, cluster analysis or manually. We can embrace the model proposed by Schütte and use collection, selection and compiling to help us organize the process (Schütte, 2004).

**2.3 Spanning the space of properties:** This space is similar to semantic space. Same as before, we can follow three steps of collecting, selecting and compiling to choose the product samples related to our KW (Schütte, 2004).

A wide range of sources such as product samples can be selected by considering the future of product. Product should have a potential to be linked with user’s Flow. In this space we can ask about the properties of ideal products from users or designers.

**2.4 Synthesis:** This step include merging the Semantic space and Space of properties. We use the result of the previous levels to make a suitable situation to use participants’ skills and make a challenge with our product range. In measuring Flow we define the span of high level and high skills.

Different methods can be used in entering the participants in their Flow mode. For instance we can ask an architect to draw the product (paying attention to his/her skills) or in case of a music lover we can play several music and ask for linking one of them with the product. Writing a poem, making a sculpture, playing with the product, taking some photos and so on are all methods to enter users in their Flow mode. During the time of Flow mode, we can ask them to use their skills to give their ideas about the characteristic of ideal product. Then ask them to answer the SD questionnaire.

This method prepares a situation to make a deep relation between user and product, make a pleasurable time by entering them in Flow mode and gain the result from their optimal experience. Furthermore, the time of keeping in Flow mode is important.

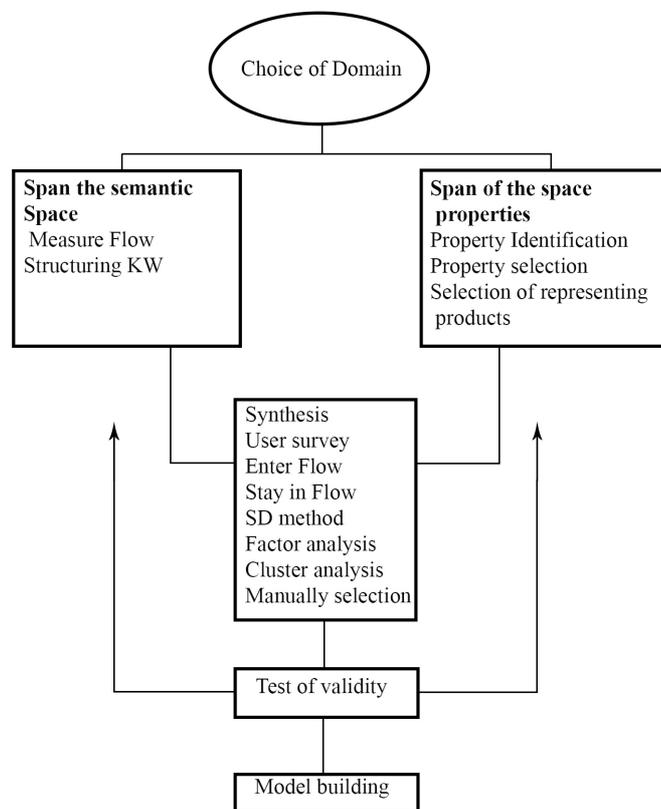
In some of KE studies based on Schütte model the picture is used instead of the original product. For example, Grimsaeth used the method of Schütte to design battery drills. They presented 23 battery drill samples in pictures (Grimsaeth, 2005). We used the same methodology as the one applied in our previous study to design table for art students at Art University of Tabriz in Iran. We presented 10 pictures of various tables to our participants (Shafieyoun, Koleini Mamaghani and Jahanbakhsh, 2010). Pictures were in high quality and three dimensioned. The participants were skilled in visualization and capable of considering three-dimensional shapes.

In some surveys, products were used as prototypes and people had the opportunity to touch and use them. For example, Shang et al. used twenty-four real telephone samples presented to 40 subjects (20 designers and 20 users) for subjective evaluation to analyze the subject perception (Hsu, 2000).

However, we know that Kansei measure with tangible products can possibly be more precise compared to tests with intangible products (pictures). Obviously, the emotional engagement with products happens in Flow and it leads to gain more trustable results. The results can be analyzed using factor and cluster analysis. We can use SPSS and EXCEL software to do that.

**2.5 Test of Validity:** Newly developed models can be tested in the same circumstances that we have described above: entering participants in Flow and asking them to investigate our new model and answering our new questionnaire in SD method.

**2.6 Model Building steps:** After gaining the satisfactory result we will have a new design of the product.



**Figure 6:** Flow KE model based on Schütte model (2005).

### 3. THE POSSIBLE APPLICATION OF THE METHOD

Our group is working with the Istituto dei Tumori di Milano, a relevant public cancer research and therapy center since January 2012. In the past, we provided and implemented some proposals, ranging from a new interior design, new way of finding signals, new patients communication, new

info points and so on. Our attention has been specifically dedicated to the waiting rooms. We use KE in one of our ongoing projects to design new waiting room.

Now we proposed a test based on the methods above-mentioned, which is a future project.

The proposed test is just related to the waiting areas in the Hospital, with about 100 users. Before starting the test we have to know about the challenges of patients and their attractions. We have to use ESM (Experience Sampling Method) for measuring Flow mode. We collect KW and make a questionnaire based on both of them.

This test is organized into three phases:

1. In the first phase, we will go in ordinary waiting area and we will measure the related Kansei with no test, by SD questionnaires. In this phase we will observe which activities patients use to distract themselves from the waiting situation.
2. In the second phase, we will prepare a situation to encourage patients in the waiting area to make them concentrated on their disease and will observe their behavior. We will measure the related Kansei after the test, by using SD questionnaires.
3. In the third phase of the test, we will introduce a useful distraction, such as the ones applied in the first test. We will evaluate the user's Kansei before and after the test, by using observations and SD questionnaires.

The results of this test provide useful method for a better understanding of user's emotion and it provides design suggestions to the relevance of introducing useful distractions into that particular site. In the mean time the tests are intended to engage in alternative, more positive experiences. Every test will show us which parameters increase the level of user satisfaction and which parameters decrease it.

Implications: users are our test groups not their caregivers. They do not need to be aware of being in a test at first, therefore we have to know which day we can catch at least twenty people in waiting area. Waiting room has to have at least one window and a TV and has a possibility to close the door. Paying attention to the weather, time and the day are important. A gloomy day is not a good choice. Briefly we need as normal position as possible.

#### **4. A PAST EXPERIENCE**

The proposal comes from previous experiences, not formalized and then scarcely measured, that suggested us to prepare the proposed method. In different areas we provided different new "signals" in the environment, and observed the different behaviors of patients and staff, depending on the changes we had done.

The above mentioned intervention were done in any waiting situation (i.e. in waiting rooms, but also in examinations or therapy rooms, when time was needed, without any possible parallel activity), and mainly related to:

- Disguise of analysis or therapy machines (e.g. NMR equipment) to transform them from aggressive equipment to "toys";
- Decoration of the walls with a rich and dense collection of paintings;
- Availability of books, also to be carried home, as in a book-crossing service;

- Availability of crosswords puzzles, and so on.

We compared the behaviors of the users in usual and “equipped” areas, and were able to observe:

- Reduction of anxiety;
- Distraction;
- Increase the number of smiling people” (or, in general, more relaxed facial expressions;
- Increase of positive feelings toward the institution and the staff.

In the other words, they entered very quickly and positively in their Flow mode.

## **5. CONCLUSION**

We developed a method to incorporate unconscious behavior in KE by integrating possibilities that Flow offers in KE. It seems that one of the advantages of this method besides promoting health and happiness in society is the usage of less advanced and low cost technology to measure Kansei. The FKE method is cheaper and easier to apply to different domains and measuring the emotion is done by the participants themselves and not by an external device. By entering persons in Flow mode, we can help them in better understanding and transmitting their own emotions. Then, we measure their Kansei unconsciously.

Psychology and sociology are inseparable parts of KE. For this study, we used KE type I and the feasibility of using other types of KE warrants further investigation.

We can do the same survey for KE and FKE and compare the results to show the amount of user’s satisfaction and happiness. Result can show the amount of user satisfaction and the amount of happiness.

Grimsaeth performed a project in KE Type I and he argued that KE is a time consuming method. We already know that our suggested FKE is even more time consuming in any case, it depends on our ability to keep participants in their Flow mode which can change their perception of time. Obviously, this method is not so simple and use of Flow concept to measure Kansei needs very high perception and patience of users.

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