Kansei cards

A visual tool supporting the investigation, discussion, and representation of the kansei-related intentions of a product to be designed

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Abstract: In order to strengthen communication efficiency between different functional teams and discuss the experience potential users could have with products, a tool composed of various sets of cards was created: the *kansei cards*. The pictures and keywords represented allow, according to the situation, for an investigation, discussion, and representation of intentional kansei qualities. Over the last three years, this tool has been used in various industrial design projects.

In this paper, we will first detail the state of the art that will set the frame for our research and introduce the key notions related to the creation of the tool and related methodologies. After having detailed our research question and hypothesis, we will present the creation of the *kansei cards* and two experimentations making use of them. The first methodology involves “users” in participatory design sessions to test if the cards permit an identification and communication of the directions of kansei-related design information. The second explores the impact that the cards have on discussions related to intentional experiences occurring within design team prior to idea-generation activities. To conclude, we will discuss the added value and limits of the tool and, more generally, the representation of kansei-related design information.

Keywords: collaborative design tool, kansei design, kansei-related design information, new concept development, picture-based early representation

1. INTRODUCTION

In design practice, the early design phase can be described as the “new concept development” (NCD) stage, which is characterised by the creation of new intellectual property (Gero, 2010). This newly acquired knowledge might have the opportunity, later in the design process, to be transformed into innovation when transferred into the development of future products or services (new product development phase). At the NCD stage, research teams (marketing people, styling designers, engineers) investigate style and rational qualities related to the product to be designed as well as in terms of trends in customer preference. At this moment of the design process, it often happens that the teams involved in these different types of consideration are disconnected one from another (Koen et al., 2002).

Products characterized as experience-driven innovations have their roots in projects at the new concept development (NCD) stage (Verganti, 2009). The design of experience is critical in these projects because decisions made at the conceptual design stage have the highest impact on the final user experience (UX) and eventually on UX failures (Karapanos & Martens, 2009). This article will explore if and how a visual tool (*kansei cards*) can support the investigation, discussion, and representation of kansei-related intentions of a product to be designed at this early stage of the design process.

2. STATE OF THE ART

2.1. User experience and the kansei process

Ortíz Nicólas and Aurisicchio (2011) analysed 11 user experience frameworks from the literature in an attempt to bring together in a consistent overview the rapidly growing and disjointed literature on the subject. The conclusion of this research suggested that even if the perspectives and focus points of the 11 researchers were different, common constituent elements (user, interaction, artefact, context) and aggregates (subjective, conscious, emotional, interconnected, dynamic) of user experience were acknowledged by the majority of the perspectives reviewed.

The situation described with the term *user experience* can be understood in relation to the definition of the *kansei process*. Lévy, Lee, and Yamanaka (2007) described the latter as the function of the brain related to “emotions, sensitivity, feelings, experience and intuition, including interactions between them” (p. 9). It is further described as originating in one’s sensory perception and personal characteristics (*kansei means*) and providing as output a qualitative meaning and value of the environment (*kansei result*). Notably, Lévy et al. indicated that the flow between kansei *means*, *process*, and *results* is not strictly linear and that these different aspects influence each other.

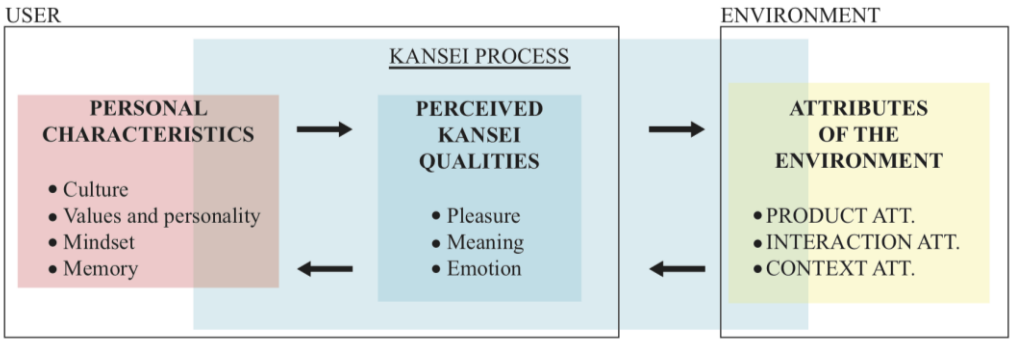


Figure 1: Kansei-experience framework

Figure 1 represents a framework that combines the notions of user experience and kansei process. It represents the main entities of an experience during the interaction between a user and a product. The *personal characteristics* and *attributes of the environment (product, interaction, context)* cover what has been previously defined as *kansei means*, whereas the perceived kansei qualities are direct consequences of *kansei results*. Notably, the framework also retains the four constituent elements of an experience identified by Ortíz Nicólas and Aurisicchio (2011). More details about the creation of this framework can be found in another publication (Gentner, 2014).

2.2. Multi-cultural design teams

A common culture exists among people who share the same nationality, organisational affiliation, function, age or gender. Yet, nowadays most design teams working in industrial design processes are multi-functional (Dahlin Weingart, & Hinds, 2005). This means that the team members have different functional backgrounds, including that of designers (styling), engineers (technology), and business managers (product planning, marketing). Related to the phenomenon of globalisation, contemporary design teams are often composed of people of different nationalities and even different organisational affiliations. This is especially true in the automotive industry, which is organised internationally in networks composed of OEMs, suppliers, and contractor companies (Miller, 1993). For all these reasons, many current design teams can be described as multi-cultural. The function of team members is determined by both their education and work experience. According to Bunderson and Sutcliffe (2002), a person's dominant function is that in which he has worked most of his life. Dominant functions give team members a functional perspective that influences the way they think, act, and behave. Differences in terms of functional perspectives between team members create "functional walls" that surround individuals and hinder interaction between team members (Bunderson & Sutcliffe, 2002).

Graff, Koria, & Karjalainen (2011) discussed these "functional walls" in conjunction with the "jointness" principle developed by Douglas and Strutton (2009). This principle was at first aiming to be used within the general organisation context. It relies on four factors: *functional competences*, *reciprocal understanding*, *cross-functional communication*, and *trust*. *Functional competences* are presented as indispensable preconditions enabling other factors to emerge (Douglas & Strutton, 2009). According to Graff, Koria & Karjalainen *reciprocal understanding* and *cross-functional communication* can be acquired through education, training, and cross-functional team experience. *Trust* is then finally built on top of reciprocal knowledge, the result of the three other factors. Cantalone, Droge, & Vickery (2002) also showed that while *trust* does not guarantee success, its absence increases the probability of failure. The presence of these factors (especially *reciprocal understanding* and *cross-functional communication*) in a cross-functional design team opens the "functional wall" and increases team effectiveness (Graff et al., 2011).

In addition to the notion of the "functional wall," authors observed other opportunities and challenges related to multi-cultural design teams. Gibson (2004) and Graff, Mikko, and Karjalainen (2009) also highlighted the importance of having multi-cultural teams at the NCD stage. It appears that even if such teams are more chaotic, they are also more likely to come up with ideas leading to breakthrough innovations (improved decision quality, greater innovation, higher adaptability).

2.3. Informational design activities and picture-based early representation

2.3.1. Design information

Bouchard, Kim, and Aoussat (2009) studied the design information expressed by design team members when discussing and brainstorming about design intentions during early design phase activities. The authors gathered design information from empirical studies. They organised it into

different design information categories, which were structured into three different groups depending on their abstraction level. The three groups identified corresponded to low, middle, and high levels of abstraction.

- *Low-level design information* corresponds to concrete and sensory attributes mainly related to the artefact to be designed (colour, shape, texture).
- *Middle-level design information* puts in relation abstract and concrete design information. It links abstract design information (i.e., high level) with information describing a design solution (i.e., low level). Middle-level design information corresponds to intended functionalities, as well as to the context and sectors or objects used as references.
- *High-level design information* corresponds to abstract information that corresponds to the user's personal characteristics, the user's perceived kansei qualities, and to attributes of the product (user's personal value, semantic words describing the experience, and styles inspirations related to the future product).

Notably, the different categories of design information identified by Bouchard et al. (2009) relate to different entities of the intended experience (user's personal characteristics, perceived kansei qualities, product attributes, interaction attributes, context attributes).

2.3.2. Informational design activity

Together with *generation*, *evaluation & decision*, and *communication*, *information* is one of the four main design activity (Bouchard & Aoussat, 2003; Cross, 2008). This model has the particularity of being fractal, as it can describe design activities occurring at different levels (e.g., at a micro-level it corresponds to designers' continuous "Seeing-Drawing-Seeing" cycle (Schön & Wiggins, 1992)). In this paper, the model will be used at a macro level in order to describe design tasks. In this case, the time span of an activity is typically counted in days.

The purpose of informational activities is to gather information and to find inspiration in order to prepare the subsequent activities (Sanders, 2005). Informational activities are usually, although not always, followed by generation activities. Several categories of tools and methodologies exist in order to support these activities (desk research (Wormald, 2010), field research (Vredenburg, Mao, Smith, & Carey, 2002), interviews (Lee Harada, & Stappers, 2002), questionnaires (Karapanos, 2010), involvement of users (Sanders, 2006)). After discussing picture-based representation in section 2.3.3, information activities involving these representations will be presented in section 2.3.4.

2.3.3. Picture-based early representation

Baxter (1995) identified several types of image-based representations created by designers and used by design teams during research and development activities. These representations focus either on targeted users and represent abstract (high-level) design information related to these users ("lifestyle boards") or on the product itself ("mood boards" and "visual theme boards"). In the case of product representations, Baxter differentiated boards that "try to identify a single expression of values for the product" (p. 222) ("mood boards") and boards that represent a style direction that is more focused on visual aesthetics ("visual theme boards"). Therefore, these two types of representations convey different categories of design information. Whereas "mood boards" are focused on high-level design information such as *analogy*, *semantic word*, and *style*, "visual theme boards" convey both low- and high-level design information related to the attributes of the product to be designed (*style*, *sector/object*, *form*, *colour*).

An ethnography study undertaken in an industrial context has shown that these compositions of images play an important role in design communication (Eckert & Stacey, 2000). The boards

described correspond to the “mood boards” defined by Baxter (1995), as they were composed of images describing an aesthetic impression direction and a specific semantic. The researchers identified that the image boards were used from the early design phase to the end of the styling design process, where they are used to illustrate sources of inspiration together with design propositions. They also highlighted the fact that “mood boards” have the property to define and communicate a design space (i.e., design direction). Another research conducted by McDonagh and Denton (2005) highlighted the importance of picture-based representations as a tool supporting both information and communication activities occurring during the NCD phase.

2.3.4. Involvement of “users” in picture-based early representation

Potential future users are often involved in user-centred design activities. They can either be treated as subjects or as partners (Sanders & Stappers, 2008). In both cases, picture-based early representations are considered simple and efficient ways to engage with users. We will now introduce two inspiring methodologies that treat potential users as partners of the design team.

- In the *mutual design approach with image-icons*, “users” are asked to select images that fit their impression of a given design brief (Lee et al., 2002). A computer-aided process permits them to construct image-icons from the selected inspirational pictures. These image-icons are used as inspiration for concept generation activities.
- *Collages* also make use of the engaging quality of images. In this methodology, “users” are asked to create picture-based representations similar to “mood-boards” or “visual theme boards” (Sanders, 2006). These collages are then used both as material to trigger discussions with “users” and as inspiration for the design team.

3. RESEARCH QUESTION AND HYPOTHESIS

The notions of “user experience,” “multi-cultural design team,” and “early representation” described in the state of the art are all underlying the research question. The research question can be formulated as follows: *How can design activities enabling the definition and representation of user experience intentions be improved?*

One hypothesis was identified in order to discuss the research question:

> H – The exchange of kansei-related design information during informational design activities can be supported by visual tools.

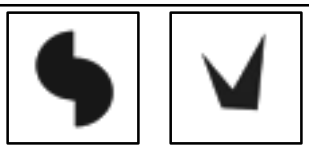
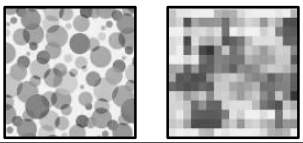
4. EXPERIMENTATIONS

In this section, we will first present the visual tool and then go through two experimentations making use of it and testing its added value. The first experimentation involves a participatory design sessions with potential users, whereas the second tests the tool with multi-cultural design teams.

4.1. Kansei cards

The intention of *kansei cards* is to enable participants of collaborative design sessions to identify and communicate their experience-related expectations or impressions regarding a context. In the state of the art, it could be seen that pictures have the ability to convey a wide range of design information. It was therefore decided that different families of pictures should be created. Each family should focus on particular categories of design information and the pictures from each family should cover the widest possible spectrum of variations within these categories.

Table 1: Example of 11 families of *kansei cards*

Family topic	Amount of cards	Main category of design information	Example of pictures
Simple shapes	59	- Semantic descriptor - Visual attribute (shape)	
Patterns	95	- Semantic descriptor - Style - Visual attribute (shape)	
Animals	47	- Value - Semantic descriptor - Emotion - Product characteristic - Gesture	
Natural landscapes	30	- Value - Semantic descriptor - Emotion	
Chairs	30	- Style - Semantic descriptor - Product characteristic	
Sports	37	- Value - Semantic descriptor - Emotion - Interface characteristic - Temporal context	
Flowers	31	- Semantic descriptor - Style - Visual attribute (shape+colour)	
Arm gestures	29	- Semantic descriptor - Emotion - Interface characteristic - Gesture	
Semantic keywords	16	- Semantic descriptor	Authentic 正真正銘、本物 Subtle さり気無い
Emotions	17	- Emotion	Amused 面白い Passionate 情熱的な
Instrumental values	18	- Value	Ambitious 野心的 Honest, Frank 正直、率直な

Through a pilot study, it was validated that participants easily extracted key design information

from the pictures and used these pictures to illustrate one of their ideas (Gentner, 2010). Another learning point from the pilot study was that it was easier to analyse and compare the association made with families of items commonly known across age groups and cultures (music instrument or animals vs. cities or cartoon heroes).

Fourteen families of *kansei cards* were then created: eleven families of pictures and three families of keywords. The families of pictures display simple shapes (59 samples), patterns (95 samples), landscapes (30 samples), products and ambiances (90 samples), chairs (30 samples), animals (47 samples), flowers (82 samples), music instruments (31 samples), localised gestures (35 samples), arm gestures (29 samples), and body gestures (28 samples). Each family of cards was created to focus on specific categories of design information (see examples in Table 1). For example, all the cards (except for those in the "flowers" family) were printed in black and white in order to remove the influence of colour. The three keyword-families correspond to semantic keywords (34 samples), emotions (33 samples), and instrumental values (18 samples). English and Japanese translations of each keyword were displayed together on the *kansei cards*. The dimensions of cards are 9x9cm for the pictures and 11x4cm for the keywords cards. Both sets of cards were made out of rigid cardboard.

4.2. Use in participatory design sessions

4.2.1. Protocol

The first experimentation was divided into three main activities. Participants followed the step-by-step protocol detailed in Figure 2. Before going through the three activities, participants were greeted and introduced to the context and the overall content and purpose of the experimentation. The context of this experimentation is the definition of UX directions for the next generation of hybrid car (NGH) and for European customers. Thirty-three participants attended the sessions. They each took about an hour to individually complete the protocol. The participants were all hybrid car drivers and were considering such cars as a possible future purchase. The participant pool covered nine different European nationalities. Belgian nationality was by far the most represented, with 11 participants (the experimentation took place in Belgium).

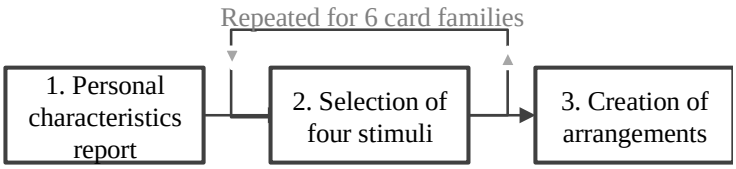


Figure 2: Protocol of the participatory design session

1. When starting the experimentation, the participants were asked to report information about their age, gender, and nationality.
2. The second section of the experimentation involved five families of *kansei cards*: "animals," "simple shapes," "patterns," "flowers," and "products and ambiances." Magnets were attached to the cards and they were organised by family on five whiteboards. The five families were selected because of their complementarity. Together they covered abstract design information related to the perceived kansei qualities, as well as to attributes of the product to be designed (e.g., emotions, semantic keywords, as well as style) and concrete design information related to the product to be designed (e.g., shape, colour, etc.). In order to even better cover concrete design information, colour samples (15x11cm) from the "Color-aid" colour model were also displayed on a table (314 samples). At this stage, the participants were introduced to the different families of samples and asked to select four samples that they considered as being the closest to their idea of NGH from each family. This selection was followed by a brief interview during which they explained their choices.

3. In this section, participants were asked to investigate possible kansei-related directions for NGH. In order to do so, they were asked to create different representations by putting together samples they had previously selected. The directions created were composed of arrangements of three to six samples and always included one colour sample. Using that colour sample, the participants were then asked to create a colour harmony using additional samples from the colour model. Once the arrangements were created, a semi-structured interview was conducted with the participant. They were asked to comment on their compositions and the ideas they wanted to convey. To conclude this section of the experimentation, the participants were asked to assess all their arrangements on 5-point semantic differential scales. A selection of six semantic keywords was used (e.g., *dynamic*, *premium*, *leading-edge*, etc.). The anchors were labelled “not at all” and “extremely,” whereas the central point was labelled “moderately.”

4.2.2. Analysis and results

For each participant, the selected of *kansei cards* and related comments were reported into a digital database. For the sake of comparison, the comments were progressively clustered (after multiple iterations) into “comment categories” corresponding to kansei qualities (e.g., *elegant*, *minimalistic*, *freedom*, *technology*, *joy*). As a result, the kansei qualities that were most often referred to could be identified. The structured database of the five kansei card families were then used as input for principal component analyses (PCA), which display on 2-axes graphs all the variables and permit to observe the main correlations occurring between them.

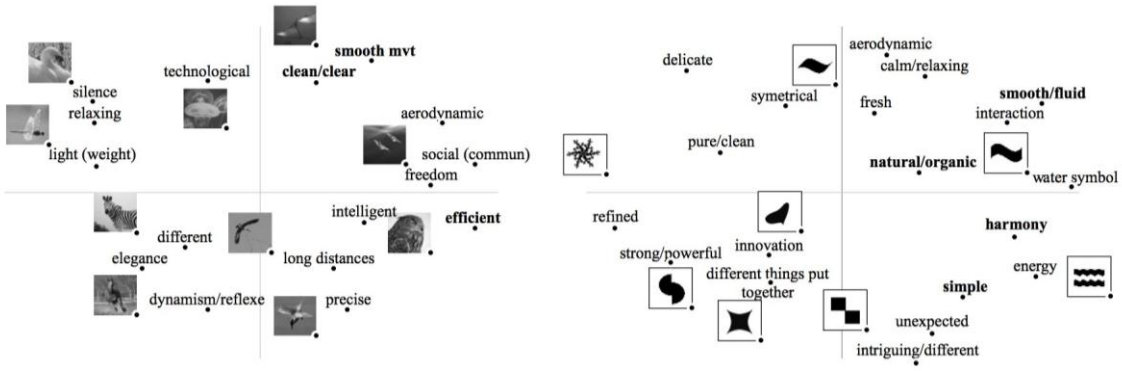


Figure 3: PCA of the “animals” and “simple shapes” families

The PCA permitted the creation of statistically robust (depending of the variability in the data represented by the principal components) kansei mappings related to each family of *kansei cards*. The ones related to the “animals” and “simple shapes” families are represented in Figure 3 (only the cards that were selected most often are displayed). Several kansei-related directions combining keywords and images can clearly be identified on both graphs. The kansei qualities to which participants referred to the most are represented in bold.

The 33 participants created a total of 89 arrangements. Using the arrangements created and described as input, another database was constructed. For each arrangement, the selected samples (*kansei cards* and colour samples) were first reported. “Comment categories” were created in similar ways as described previously. The rating of the arrangements relative to the six semantic keywords was also integrated to the database. These variables were particularly interesting because they had the particularity of being common to every arrangement (5-point SD scale rating). In this case, in addition to a PCA, a hierarchical cluster analysis (HCA) was made using the first five principal components. This enabled an identification of the seven main clusters of correlated variables. Each of the 89 arrangements can be related to one of the clusters on the PCA mapping (depending of their position relative to the area covered by each cluster). Figure 4 details two of the seven clusters identified. In addition to the expressed and rated kansei qualities, the *kansei cards*

that appeared the most in each cluster are also shown. For each cluster, the most selected kansei quality is represented in bold. A specific activity was also conducted regarding colours and colour contrasts. Parts of the results are displayed at the bottom of each cluster. Each cluster also contains an example of colour harmony, description of the typical hue and of the typical intensity of contrast of hue and light-dark contrast (as described by Itten (1967)). This activity combined statistical analysis (colour and type of contrast related to each cluster) as well as interpretation of the arrangements made (description of the hue and contrast using pictures of the 89 arrangements).

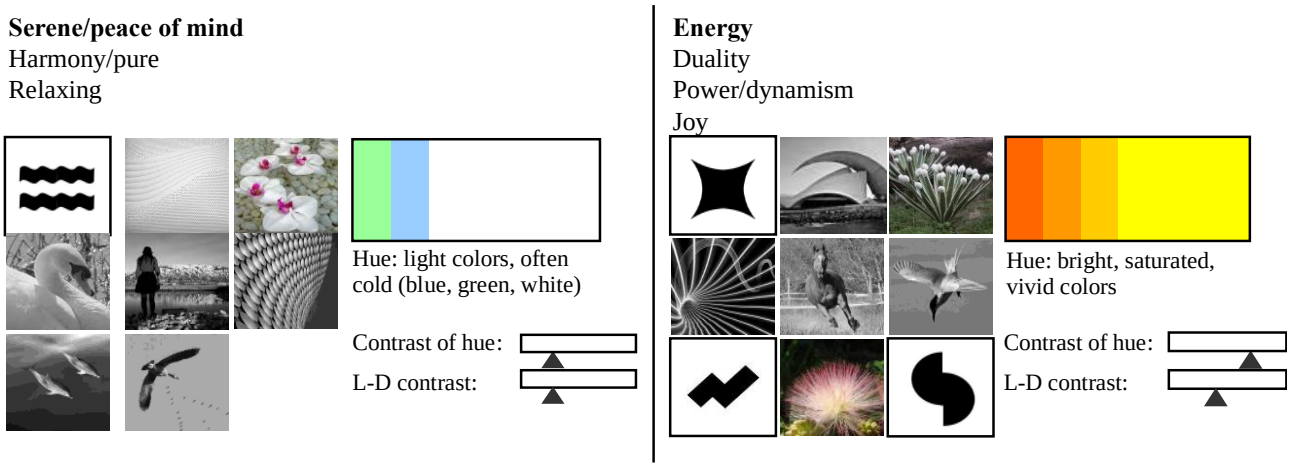


Figure 4: Example of 2 clusters

4.3. Use as a co-design tool within a design team

4.3.1. Protocol

For the second experimentation, two protocols were created: one for the *control group* and one for the *test group* (Figure 5). The groups both represented multi-cultural design teams. Only section B of the protocol was different for the two groups, whereby the *test group* participated in a co-design activity involving the *kansei cards* whereas the *control group* did not.

Two design challenges were tested in this experimentation. For each of them, a *control group* (CG) and a *test group* (TG) followed the protocols detailed in Figure 5 (four groups in total). The groups representing the design teams were multi-cultural. They were always composed of two professional engineers and two professional styling designers. For each of them the gender and nationality distribution of the participants was the same: two males and two females, and two Europeans and two Japanese. All of them were Toyota Motor Europe (TME) employees, and the moderator was always the first author of this paper. The groups were nevertheless not real design team as the participants were selected on a voluntary basis. Some of the participants knew each other but none of them were used to working together. It took approximately 1 hour for the *control groups* and 1 hour and 30 minutes for the *test groups* to complete all the tasks.

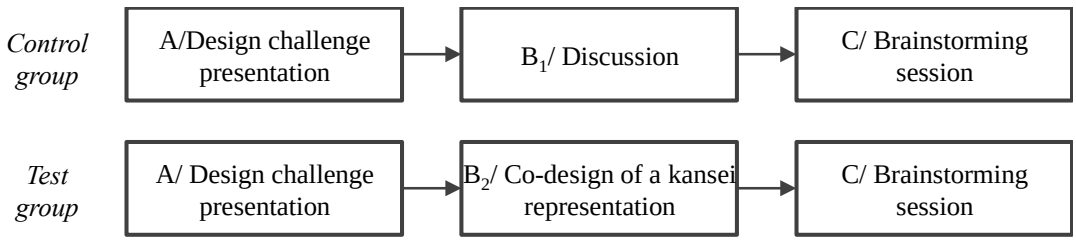


Figure 5: Protocol of the co-design activity

1. Both groups started with the “design challenge presentation” section. This consisted of a presentation on the project’s background and the findings of researches previously undertaken

(technology, context). It took a total of approximately 15 minutes. A design challenge related to the urban mobility topic was then presented to the design team. The two design challenges used in this experimentation were “Give more flexibility to people using their car as a working tool (e.g., nurses, salespeople)” (DC1) and “Give elderly people easier access to their favourite places” (DC2). Note that the design challenges were created for the purpose of this experimentation and are not related to any project currently investigated by TME.

2a. For the *control group*, section B consisted of a free discussion about the topic and the design challenge among the members of the group. This section lasted about 15 minutes for both control groups.

2b. For the *test group*, the presentation of the design challenge was followed by a “kansei representation co-design” activity. During this activity, the participants were asked to position cards from different families on a table. Two axes representative of the context of study and prepared before the experimentation structured the space. In both cases, the anchors of the axes used were labelled “city centre” and ”suburbs,” and “efficient” and “comfortable.” The participants selected cards they believed to be relevant and discussed the positioning of the cards among themselves. This allowed them to co-create a common kansei representation of the field studied (Figure 6). This activity was moderated in order to last 45 minutes. For both design challenges, five families of *kansei cards* were used: “animals,” “sports,” “music instruments,” “semantic words,” and “emotions.” Examples of cards are visible in Table 1. These families were selected because they appeared to be complementary and relevant to the topic of the experimentation.

Figure 6: Result of the co-design activity before rating the cards

3. For both *control groups* and *test groups*, the final section was a brainstorming session. The participants were given 25 minutes to generate ideas and represent them on A5 pieces of papers. Before that, the activity was presented to them (including rules such as “Encourage wild ideas," "Build on the ideas of others," "Stay focused on the topic," "Respect everyone and let everyone speak") and examples of ideas were given by the moderator.

4.3.2. Analysis and results

The “kansei representation co-design” activity was new to all the participants of the *test groups*. The tasks (including discussing, positioning, and rating the cards) seemed rather easy for them to accomplish. They all reacted positively and contributed with interest. This activity enabled the groups involved in both design challenges to define together the kansei states (user’s values, emotions felt, possible semantic-related needs, etc.) that a potential user would have in several situations. The cards also facilitated discussions related to the artefact to be designed (e.g., style intention, sensory characteristics) and its context (e.g., road infrastructure, issues related to period of the day and transportation behaviours).

In total, the participants created 66 concept ideas (33 for both design challenges). These ideas were given to three user experience experts (professional or academic), who were asked to assess them according to two criteria: their kansei qualities and rational qualities. Using predefined guidelines, the experts individually assigned a number of stars to each concept idea (from 1 to 3). If a consensus was not reached for specific concepts at this stage, it was reached after discussion between the three experts. Figure 7 presents two concept ideas related to the first design challenge (both created by test group participants). The idea on the left has been rated 1 star by the expert panel, whereas the one of the right has been rated 3 stars.

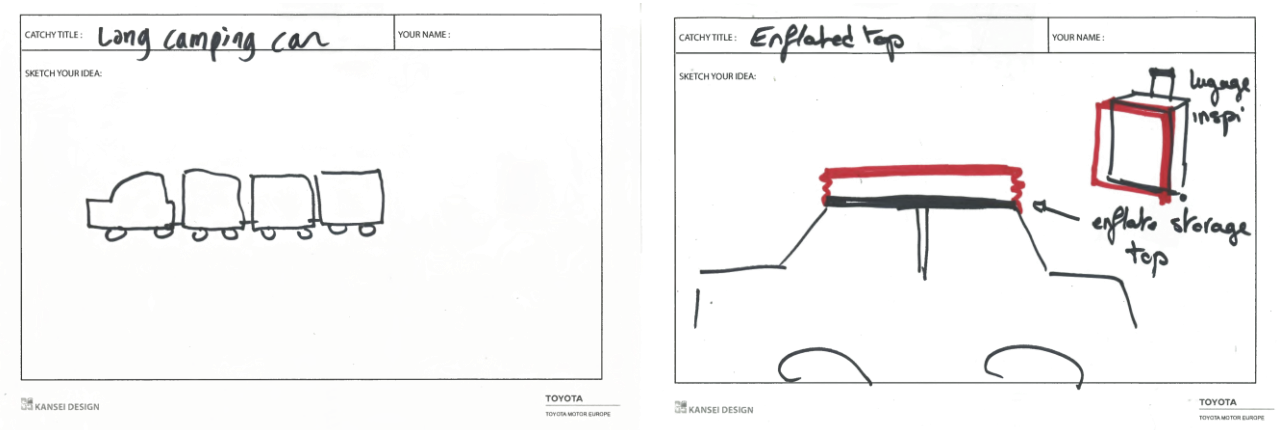


Figure 7: Concept generation for DC1 and rated with 1 star (left) and 3 stars (right)

When comparing the results of both groups, it appeared that the concept created by the participants involved in *test groups* surpasses the ones from *control groups* in terms of both quality and quantity (Table 2). On average, the brainstorming following a co-design activity produced 66% more concepts and had a higher ratio of valuable concepts: 80% of them were rated 2 or 3 stars for the *test group* instead of 68% for the *control group*. Even though the amount of brainstorming organised is not significant enough to draw conclusions about the exact added value of the co-design of kansei representation activity, it appeared to have a significant impact on the brainstorming performance of multi-cultural design teams.

Table 2: Rating of the concepts created by the four different groups

Groups	Design challenge	1 star concepts	2 stars concepts	3 stars concepts	Total
Control group	DC1	3	3	5	11
Test group	DC1	5	8	9	22
Control group	DC2	5	4	5	14
Test group	DC2	3	7	9	19

5. DISCUSSIONS

In the previous section, the *kansei cards* were presented and two ways of using them during early phase design activities were investigated with two distinctive experimentations.

In the first experimentation, the cards were used in participatory design sessions involving potential future users. The methodology presented is situated between the *mutual design approach with image-icons* (Lee et al., 2002) based on logical and structured reasoning, and *collage* methodology (Sanders, 2006) based on an intuitive and abductive way of thinking. Guided with predefined samples and a protocol including association sessions and semi-directed interviews, the participants were able to construct their own images of intended user experiences including pictures

and words. Statistical analysis permitted then to construct seven main experience directions for future hybrid cars from the input of the 33 participants. The directions cover design information with low to high levels of abstraction and include explicit keywords as well as inspirational pictures and colour harmonies.

The second experimentation exemplified in a structured setting the way the *kansei cards* are used to trigger discussions among multi-cultural design teams. It first showed that the design teams members are able to discuss user experience-related topics with design information with both high and low levels of abstraction. The comparison with discussions not involving these picture-based early representations showed that when using the cards the outcomes following concept generation activities were better in terms and quality and quantity. This led us to think that the use of the cards tends to break down walls between design team members of different genders, functions, and nationalities. In that sense, the cards probably positively influence factors such as *reciprocal understanding*, *cross-cultural communication*, and *trust* within design teams (Graff et al., 2011). Visually representing design intentions also permits for a communication of the sources of inspiration together with design propositions in later stages of the design process. Eckert and Stacey (2000) have highlighted the positive effect of this combination on communication activities. This aspect could nevertheless not be examined in the experimentation developed in this paper.

Both experimentations validated our hypothesis (H – The exchange of kansei-related design information during informational design activities can be supported by visual tools). Indeed, in both cases the *kansei cards* were used to gather or exchange a wide range of design information, with low to high abstraction levels. This information has the particularity of covering intentions related to kansei means (personal characteristics, attributes of the environment) and to direct consequences of the kansei results (perceived kansei qualities). In that sense, the two design methodologies presented correspond to valid answers to our research question (*How can design activities enabling the definition and representation of user experience intentions be improved?*). Limitations can nevertheless be identified. For instance, the families of *kansei cards* fail to describe the complete scope of possibilities for any given design information category and some categories are rarely covered (tactile attributes only included to some extent in “animals,” “music instruments,” and “products and environments”). Also, the families of cards only contribute rather vaguely to discussions related to intentional interactions attributes. Picture-based early representations are therefore complementary to other types of early representations such as multisensory representations or narrative (often scenario-based) representations.

6. CONCLUSION AND PERSPECTIVES

From a general perspective, the *kansei cards* presented in this article can be seen as an attempt to emphasize the importance of exchanging kansei-related design information in early phases of the design process. This paper showed that it is possible to represent a complex combination of design information before styling design activities (e.g., initial sketches). Moreover, it showed that it is possible to do this with only limited material and resources. Finally, it also allowed us to identify that these early kansei-related design information exchanges appear to have a positive influence on the subsequent generation activities.

Notably, the tool and experimentations presented in this paper point towards greater prospects. Several other experimentations that have been either planned or conducted following those presented here will enable better understandings of the design information exchanged in the early design phases and create methodologies and early representations that fit more situations.

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BIOGRAPHY

Alexandre Gentner recently defended his PhD research focusing on the definition and representation of user experience intentions in the early phases of the industrial design process. This action research was made possible because of a long-lasting collaboration between Arts&Métiers ParisTech (university) and Toyota Motor Europe (industrial partner). In this research, he explored the bridges existing between user experience and kansei research and the way these aspects can be addressed in early design activities. Some of the industrial contributions of this research were the creation of tools and methodologies supporting the reciprocal understanding of design information-rich representations of user experience directions.

Carole Bouchard is professor at Arts&Métiers, ParisTech (France). She teaches and guides research in The Product Design and Innovation Laboratory. She obtained her PhD in 1997 in the field of automotive design and is professor since 2012. Her research focus lies on Kansei Design, as well as creativity and innovation in early design stages. She pilots various research projects that seek to develop innovative design tools to efficiently integrate the Kansei in the design process and was one of the organizers of KEER 2010.

Aurélien Badoil is product designer and works for the Kansei Design Division since 2011. He graduated from the design school Strate Collège (France) the same year. He is interested in the synergies between the fields of product design, interaction design and design research.

Carole Favart is leading the Kansei Design Division based in Toyota's European R&D centre (Belgium). She initiated this design-oriented cross-functional division at Toyota Motor Europe (TME) in order to optimize synergies between R&D, Product Planning and Design. This division, created in 2004, was recently promoted as one of TME R&D's "Competency Centre", and is unique in the Toyota organisation. It plays an active role for advanced models and vehicle development, creating also new methodologies and tools supporting strategic design as well as mid- and long-term visions. Since 1990, Carole Favart is also involved in design education (teacher and jury). She is also part of as well as in professional design think tank and committees.