

## Educational Experience in Kansei

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**Abstract:** Since the earliest *Kansei* works saw the light now more than 30 years ago, the *Kansei* has boomed exponentially. Because of many and various achieved business successes by different working groups as well as the methodology geographical dispersion throughout the world. Multi-faceted *Kansei* has been developed for the last 20 years in a very wide and varied way.

The *Kansei* has experienced as if talking of a tree, a branching experience still going on nowadays. Today we can speak from *Kansei in theory*, *Kansei emotion measurement*, *Kansei engineering*, *Kansei information*, *Kansei education*, *Kansei design* to *Kansei in practice* and many other disciplines.

Three years ago our team started the experience to introduce *Kansei* in the educational atmosphere, applying it to the final degree projects. In the School of Building Engineering at the Universitat Politècnica de València and inside its final degree project proposal, a workshop on Kansei Engineering was offered. During these years at the eighth semester of the building engineer degree, students have been working for almost 5 months under the supervision of a team of teachers on their final project till the final public oral defense was made in front of a committee.

During these years we have worked with an average of 10 students per year. Some have successfully completed their final projects, others have not achieved the minimum required. The article aims to explain the experience during the last 3 years the team has accumulated in Kansei Education, and can be of interest for every teacher.

**Keywords:** Academic Kansei, Kansei final project, educational experience.

## 1. INTRODUCTION

Kansei has been spreading around the world for over these last 30 years. As a result of many and various achieved business successes by different working groups, and because of its inner interest and the worldwide spread of its methodology nowadays we can find a huge range of different ways of using kansei and its extension itself.

The orderliness covered are numerous and diverse increasing since 1878, when Amane Nishi characterized the *Kansei* term in an academic context for the first time. Following Shimizu et al. (2004) and Lévy (2013) we can find differences between Kansei Engineering, Kansei Science (Harada 2003) and Kansei Design or Kansei sociology (Takeda 2006), we can find aswell the term Kansei associated with marketing (Dentsu, 1985 and Fujioka, 1984).

As a reflection of this we only have to take a look into KEER itself where we can find a various set of disciplines. One of the KEER scopes is to attempt to represent most facets of the areas in wich Kansei research is carried out. The conference will therefore include different kansei aspects such as kansei theory, kansei emotion measurement, kansei information, kansei education, kansei engineering till kansei in practice.

In our day by day routine we have been including and living with kansei in various facets. Kansei has become an important part of our lives, started reading and assimilating after we tried to discover and experience ending with new investigations and publications. We started with the earlier kansei stages and nowadays we are working with kansei and the new ICT (information communication and technologies). All this involves expending great time with different kansei areas. Most of us are university teachers and one of our higher ambitions is to unify teaching and research in order to keep both at the top possible level.

This objective, easy to understand, helps us to focus on one knowledge and scientific area so that all our efforts have a unique target helping us to be more efficient at teaching and scientific level. Within this context our working group tried to join both our teaching and our scientific objectives, and we found the clue due to the Bologna process of adaptation to the new draft European Higher Education Area (EHEA).

This paper objective is to describe a kansei educational experience. We aim to describe the processes followed to involve and motivate building engineers students non indoctrinate with kanseis methodologies. Showing the results obtained not only in a quantitative way but also from the different surveys and interviews with the pupils.

The paper maybe of interest to every single teacher with kansei feelings. And research groups in order to know the viability of such methodologies.

## 2. EDUCATIONAL ENVIRONMENT

The process of adaptation to the EHEA has brought significant changes in the methodology of university education through the new European Credit Transfer System (ECTS). However, the implementation by universities is not limited to adapt program content to a new structure, but also implies a deeper transformation requiring a methodological renewal that includes changes in teaching methods and procedures to be used in the development of the teaching-learning process. With this opportunity of paradigm change the need to implement kansei education was reachable.

This scenario also includes the Final Project (FP) development as main part of our experience. The FP is developed differently to all the other subjects of the university curriculum as Caro et al. (2005) say, and is mandatory at the end of university studies as it should reflect all the knowledge and skills acquired during the degree.

At Spanish universities and according to the Libro blanco (2004) (Building Engineering White Book) final degree project is developed during the eighth semester, and has a teaching order of 12 ECTS where they should develop the competencies, skills and following abilities:

- Integrate training content received in a construction project and its management.
- Research in one of the lines established by the departments.
- Exchange with other schools in the framework of national and international relations.
- Conducting educational cooperation agreements signed by the university and the administration or public and private undertaking

The School of Building Engineering (ETSIE) of the Universitat Politècnica de València (UPV), in order to adapt to the new EHEA implemented a new system through scientific-technical workshops initiated in 2010-2011 academic year in order to prepare the Final Project Degree in Building Engineer by UPV. These workshops had to be carried out during 4 ½ months and attended between 4 and 15 students per group supervised by a team of teachers till they reached their final public defense. The pedagogical methodology used in the Final Project workshops is based on project-based learning (PBL) activities. This active teaching methodology has a holistic approach to education and is designed to engage students in authentic research problems Blumenfeld et al. (1991) so it obviously differs from traditional teaching processes Kubiutki et al. (2011).

This paper aims to show how kansei methodology has been used in an educational environment and has been applied to such an interesting, immersive and important subject such as the Final Project.

### **3. TEACHING METHODOLOGIES**

#### **3.1. WORKSHOP DESCRIPTION**

Within this entire environment our group formed by the four authors found the key to develop a Kansei educational experience. The main aim was to experience the possibility of developing a Kansei study with non indoctrinated persons in a bit more than 4 months, and that this work had the entity a university final project demands.

The workshop has been offered for the last 3 years since 2011. The workshop has been tendered to the students as “New Techniques for designing user-oriented architectural spaces”. The ETSIE workshop complete offer was about 40 different areas all of them related to architecture, building technologies, building management, building rehabilitation, energy efficiency among others. The amount of pupils demanding final project workshops has been about 400 students per year, having each workshop between 4 to 15 students. All students were completely free to choose the workshop they wanted to attend until it was full. Once one workshop was full it was closed for new applicants.

The overall objective of the workshop had as said before two main objectives, on one side to practice educational Kansei experience and on the other hand to develop a Final Project (FP) at university level. All this using Kansei Engineering (KE) methodology to architectural spaces. As is

well known from Nagamachi (1989), the methodology consist in finding the relationship between the perception that a product has according to its own user language, the various designing parameters that define such product and product assessment as a whole.

Students have to realize that in order to design a product is essential to involve every single participant on the project within the designing process, the end user, sales men, production technicians, designers, quality controllers and so on. This way of project management is used in many industrialized sectors. However, related to architecture and the building sector this is not so common, the end user and even all the intermediate stakeholders, suppliers or partners involved in the construction process are not usually part of the designing and architectural process. With this aim, students must analyze the perceptions and identify the designing elements and parameters that cause those perceptions through different architectural spaces of the Universitat Politècnica de València. In particular students should be able to:

- Assimilate the concepts of "Kansei methodology" research and apply it to the design of an architectural space.
- Develop "KE" research methodology (affinity diagram, fieldwork and statistical data processing).
- Analyze research data.
- Discuss the results and research methodology.
- Being able to attend and guide an oral public defense of his work.

Pupils have to deliver by the end of the semester 3 main things. One essay describing their whole work, an oral defense in front of a committee and a poster as a synthesis of the whole work and in order to disseminate workshop results.

In order to show the workshop structure the FP essay structure is as follows:

COVER

INDEX

1. INTRODUCTION. Defining the essay aim, and project description.
  - 1.1. Background
  - 1.2. Essay Structure
2. LITERATURE REVIEW.
  - 2.1. Design Techniques of user-oriented products.
  - 2.2. Studies of perception and semantic differential.
  - 2.3. Studies of architectural space.
3. OBJECTIVES AND HYPOTHESIS
  - 3.1. Objectives
  - 3.2. Hypothesis
4. MATERIALS AND METHODS. Identify key design elements of architectural spaces causing a positive overall rating in the user.

- 4.1. Identifying perceptions resulting from the architectural space.
- 4.2. Getting the design elements associated with the architectural space.
- 4.3. Development of questionnaires.
- 4.4. Selection and sample size.
- 4.5. Development of the fieldwork.
- 4.6. Data processing and statistical analyzes by using SPSS.
5. RESULTS.
6. CONCLUSIONS.
7. References.

### **3.2. WORKSHOP STRUCTURE AND METHODOLOGY**

The methodology used in the FP workshops is based on the PBL technique, which is an active learning-teaching procedure. This methodology was chosen to allow students an independently way of learning with mentoring and supervision by the workshop supervisors in order to acquire research skills. In order to keep a correct supervision and to establish some milestones a number of presently and group sessions were established. The total compulsory minimum classroom hours were 20, and they were divided into 10 sessions of two hours per session (spare).

The classroom activities were organized according to the objectives to be achieved in each of the different session. These activities were reflected in:

- Theoretical sessions (30%) to provide students with a guide or basic guidelines for learning the methodology and other needs they may have.
- Development, analysis and discussion of data and methodology (57.5%) contrasting impressions with students and analyzing all their collected data.
- Individual work guided by the teacher at class (12.5%)

At the end of each of the different sessions, the student got a stunt of activities they must develop for the next one. These tasks were a part of the final essay to be develop as well as the implementation and drafting of research. Another important aspect is that the FP development is completely individual. However, there are tasks that require cooperative character as data collection and fieldwork for the survey collection, where students worked together and developed teamwork skills.

Table 1 shows the activities that are taking place, both in the classroom and independent work of the student according to the objectives for each session.

**Table 1: Workshop Structure**

<b>WEEK</b>	<b>Objective</b>	<b>Classroom activity (2 hours/week)</b>	<b>Outdoor activity</b>	<b>Assessment</b>
<b>01</b>	Students must assimilate the concepts of KE methodology in order to apply it to the design of an architectural space	Workshop Introduction: objectives, methodology, evaluation, structure (1 hour).  Explanation and introduction to the methodology of KE. Information is provided. (0.5 hours)  Explanation of how perceptions and design elements of an architectural space are collected. (0.5 hours)	Pickup perceptions or expressions that generate the architectural spaces and design elements by visiting buildings and spaces of the university, journal and book review ...  Bring pictures of different spaces  Provided reading literature.	Workshop attendance
<b>02</b>	Students must be able to perform the affinity diagram perceptions or expressions that generate the offices and develop the literature review chapter.	Affinity diagrams or expressions that generate perceptions cabinets (2 hours). 	Bibliographic research information of the concept of KE as well as research methodology.  Writing chapter of the literature review.	Workshop attendance  Evaluation of the information provided by the student in the collected perceptions and participation in the activity
<b>03</b>	Students must be able to perform the affinity diagram design elements that make up the architectural spaces and to develop the methodology chapter done so far.	Affinity diagrams of the design elements that make up the offices (2 hours). 	Writing the literature review chapter.  Writing the methodology development up to now.	Workshop attendance  Evaluation of the information provided by the student design elements contained and participation in the activity
<b>04</b>	Students must be able to carry out the field study and develop the methodology chapter done so far	Preparation of the survey (1 hour).  Presentation of the process through surveys and data collection (1 hour).  Collection of essays: a literature review	Fieldwork.  Write the methodology developed to this point.	Workshop attendance  Evaluation of the literature review

<b>WEEK</b>	<b>Objective</b>	<b>Classroom activity (2 hours/week)</b>	<b>Outdoor activity</b>	<b>Assessment</b>
<b>05</b>	Students must be able to prepare the data in order to analyze them	Session data processing. Coding in Excel to treat in SPSS (1.5 hours). Review papers: literature review (0.5 hours).	Fieldwork. Write the methodology used up to this point.	Workshop attendance. Evaluation of the methodology to this point.
<b>06</b>	Students must be able to analyze objective data.	Session data statistical processing objective parameters (1 hour). Comment results (1 hour).	Analyze results and draw up to this point. (Methodology and results)	Workshop attendance. Evaluation of the methodology and results to this point.
<b>07</b>	Students must be able to analyze the subjective data (perceptions)	Statistical data processing perceptions (1 hour). Comment results (1 hour).	Interpret results and draw up to this point. (Methodology and results)	Workshop attendance Evaluation of the methodology and results to this point.
<b>08</b>	Students must be able to analyze the subjective data (perceptions and design elements)	Statistical data treatment and design elements relating to perceptions. (1 hour). Comment results (1 hour).	Interpret results and draw up to this point. (Methodology and results)	Workshop attendance. Evaluation of the methodology and results to this point.
<b>09</b>	Students should be able to write conclusions	Individual working session. (1 hour). Review papers: methodology and results (1 hour).	Correction of mistakes Write conclusions	Workshop attendance. Evaluation of the FP
<b>10</b>	Students should be able to develop oral communication and presentation and FP panel	FP final presentation session (1 hour). Review of complete essays. (1 hour).	Mistakes corrections and final doubts	Workshop attendance. Exposure assessment and Poster

### 3.3. WORKSHOP ASSESSMENT

The whole evaluation is a continuous and formative task, thought pupils have been personally guided right since the beginning. The pupil advance and the essay is assessed in every milestone having had more than 4 reviews before the final one. Every evaluation is formative and is discussed with each of the students personally face to face. Before their final oral defense they need to be assessed by the FP supervisors who are the workshop teachers. This final supervision determines who can attend the final oral defense and who has not reached the minimum level required for a FP. Every student gets a final inform from its supervisor that allows them to go into the last step which is the final oral defense. This final inform by the FP workshop responsible will be issued if the student has developed the FP working properly and therefore developed all outdoor activities and attended all FP sessions

The final FP assessment is conducted by a committee appointed for this purpose. The committee is made up by three teachers two selected by lot and the third one invited by the workshop supervisors. The minimum requirements for the oral defense are:

- The student must have passed the total credits of the degree except the FP.
- Students must have been authorized by their academic director or person in charge of the FP workshop.

The final qualification obtained in the FP has been changing during these three years. The two first ones 2011-2012 the 70% of the final qualification was assessed by the pupil supervisor and the 30% by the committee. This has change on 2013 were the whole assessment correspond to the committee.

### 3.4. WORKSHOP DISSEMINATION

In order to make the workshop result visual and to spread the knowledge every single student attending the oral defense is asked to prepare a poster of his individual work (figure 1). These posters are exposed in two different exhibitions centers, the first one is the ETSIE exhibition room and the second one is “Salon Tecnológico Internacional de la Construcción” EXCO (International Building Technology Exhibition).

This task prepares them to synthesize the whole work developed during the last 4 months and to prepare their oral defense.

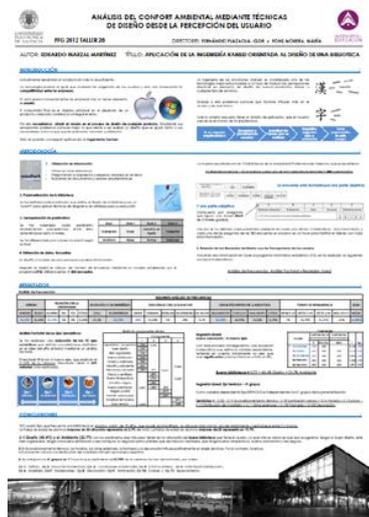


Figure 1: Sample student panel

#### 4. RESULTS AND CONCLUSIONS

There are two types of results, the quantitative ones obtained from the enrolled students, its assistance, final qualifications and so on and the qualitative ones obtained from different surveys and interviews with the pupils that end to be almost colleagues at the very end of the workshop.

According to the results shown in Table 2 the percentage of projects oral defended has been increasing throughout the years. Although not shown, the percentage of the first year non defended (because they do not met the minimum) students was 55.56%. Despite this we can highlight that 60% of those non defended repeated the same workshop the following year, Table 3.

This is due to two reasons: the student has not passed the entire total credits of the degree except the FP and student interest in the FP development.

**Table 2:** Enrolled, submitted and not submitted students to the workshop during the 3 academic years.

	Course 2010/2011		Course 2011/2012		Course 2012/2013	
	Number	%	Number	%	Number	%
<b>Enrolled</b>	18		16		13	
<b>Approved</b>	8	44.44 %	10	62.50%	10	76.92%
<b>Suspended</b>	10	55.56%	6	37.50%	3	23.07%

**Table 3:** Repetition ratios of the suspended students.

	Course 2010/2011		Course 2011/2012		Course 2012/2013	
	Number	%	Number	%	Number	%
<b>Suspended</b>	10		6		4	
<b>Registered for the following year</b>	6	60.00 %	3	50.00%	2	50%
<b>Not enrolled for the following course</b>	4	40.00%	3	50.00%	2	50%

Moreover, to assess the results of the implementation of scientific and technical workshop in-depth interviews were conducted with randomly selected students to extract certain relevant data. As a result the students improve their affinity to an area of research prior unknown. However, they expressed the difficulty of developing a research in which subjective impressions of users assessing architectural spaces makes them assume a conflict from the technical point of view. Another aspect to the fore of qualitative research is student satisfaction about the FP when finalized, when in principle, it seemed to take on a difficult challenge.

In the qualitative side the first result is that pupils chose our workshop among others even though ours was the furthest in content regarding to their studies. This was a surprise because at the beginning, with the previous workshop information they had, almost none of them really knew what was it about. The beginnings were very difficult because they could hardly understand the methodology and the final objective. Speaking about relations between perceptions and design

parameters sound magic to them. This image was completely changed in the 100% of the cases once they were able to analyze the statistical data.

For our team the kansei educational experience has been successful during these 3 academic years. But also has to be said that the workshop instructors consider that a huge effort is required by both the student and the teacher to develop the PBL methodologies within the kansei area at ETSIE. In fact, according to the results shown in Table 3 it can be seen that the enrollment exceeds the limit of 15 planned on the scientific-technical ETSIE workshops because of an accepted demand. So, after the experience of the first workshop course, the decision was not to increase the number of students for next editions, despite this it was proposed for next courses, to develop FP work in pairs to reduce the total effort.

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