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Fundamentals of Kansei Engineering: A Literature Review and the Intercourse Between Surface Design and Aircraft Interior

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1 Context

The Kansei Engineering (KE) has Japanese origin and was developed by Professor Mitsui Nagamachi who sought to translate feelings and preferences of the users in the development of products for the industry. According to Nagamachi (1995), KE methodology follows three important points:

1. To understand the user as much as possible;
2. To reflect and interpret understanding of the consumer needs (user) in the design of the product;
3. To implement a system oriented to Kansei design.

The reason for the search of this article is to link the following topics themes: The surface design (colors and textures) applied to the interior of aircraft. In the first stage article, it was applied the unsystematic research method (narrative, random) according to up-to date academic work. The second stage of the search refinement was applied to systematic research method (SRM) in order to find the main theoretical gaps of Kansei methodology applied in the development of the surface interior design for aircrafts.

The question that this article seeks to answer is: "What are the emphases and / or methodological gaps in the implementation of KE methodology in the development of surface interior design for aircrafts?"

The survey used as bibliographic sources the main database platforms available in the academia. Relyied on such as CAPES journals, Science Direct and IEEE Xplore Digital Library.

2 Method

The examination of the emphases and theoretical shortcomings of the problem leads to the following question: "What are the emphases and / or methodological gaps in the implementation of KE methodology that have development areas of design for the aircraft interior". This question is raised in after following the two review stages: the first stage consists of the Unsystematic bibliographical review (UBR), and the second stage consists of the Systematic literature review (SLR).

Unsystematic Bibliographical Review (UBR)

The first stage of the UBR investigation was carried out through literature review of prominent authors such as Schütte and Nagamachi and research groups at Federal University of Parana in Brazil that address the main theme.

Systematic Literature Review (SLR)

The theoretical gaps were found in the in the SLR: The search was conducted by finding other works related to the themes "surface design" which were added to the "aircraft interior." The embodiment of SLR was done by searching for Amaral authors (2011), whose guide has 15 stages distributed into three phases:

(1) Input;
(2) Process;
(3) Output.

(1) Input Phase

In this phase of SLR, the research question was defined: "What are the emphases and gaps on the KE in the development of aircraft surface design?" The objectives of the SLR are: to recognize the main approaches of KE; to identify the main authors of the surface design field, more specifically in color & trim inside aircraft / car; and to stage the main identified goal and collected the main emphases and research gaps indicated by existing studies.

(2) Process Phase

The search was carried out in the following order in the second stage:

a) Taking into consideration the objective of the literature review which is the search identified the emphases and research gaps in the KE field in the development of interior textures and shapes inside the aircrafts.
b) Qualifying criterion which adopted the article publishing field, which should be in the area of interest research, such as production engineering, arts, psychology.
c) Period criterion of publication was usually only the first search for the quantitative knowledge of the subject, the three subsequent the search was limited to articles published between 2000 and 2016.

(3) The output phase is the result.

3 Results

The SLR search led to the following authors: Jindo (1995), Hirasago (1997), Schütte (1997), Tanoue (1997), Heecheon (2006), Santos (2010), El Marghani (2011), Carreira (2012), Konstantinos (2015). These authors consider the user as an active participant focus on the KE methodology. By performing both the SLR as the selections by the references of 9 articles, whose nine authors respectively, in chronological order are: Jindo (1995), Hirasago (1997), Schütte (1997), Tanoue (1997), Heecheon (2006), Santos (2010), El Marghani (2011), Career (2012), Konstantinos (2015), focusing on the methodology of KE user-centric as a participant in the development of products.

Themes/authors	Jindo (1995)	Hirasago	Schütte	Tanoue	Heecheon	Santos	Carreira	El Marghani	Konstantino	Resultados
Kansei Engineering	■	■	■	■	■	■	■	■	o	
Surface Design	■			■	■				⊘	
Car Interior	■	■		■	■				o	
Aircraft interior						■		■		⊘
User satisfaction	■	o	■	■	■	■	■	■	■	

Frame - Results of the gaps

Reasoned and detailed	■
Don't detailed	o
Not address	
International	*Itálico*

National	Normal
Gap of research	⦸

Legend of frame

4 Conclusions

There are 455 articles on KE in international publications, but in Brazil this topic is still little disseminated, with only 7 articles

To sum up, through this SLR, 9 articles were selected and provided p the main approaches of KE in the area of: a) production / process design as a key field of developing methods, techniques; b) support tools for the realization of efficient results in the production of materials and c) processes of surface design into the aircraft interior aiming to passenger satisfaction.
Given the context, it is recommended that future research looks for the identification and understanding of the mechanisms of KE methodology in the preparation and surface design that mitigates the adverse stress during flights, taking into account the satisfaction and both physical and psychic security of the user.

5 References

1. AMARAL, D.C. et al. Roteiro para revisão bibliográfica sistemática: aplicação no desenvolvimento de produtos e gerenciamento de projetos. 8º Congresso Brasileiro de Gestão de Desenvolvimento de Produto - CNGDP 2011, p. 1-12, 2011.
2. CARREIRA Rui, et al. Aplicação da metodologia de engenharia kansei para melhorar a incorporação de requisitos de experiência em desenvolvimento de novos produtos. Revista Informação. Londrina, v. 17 n. 2, p. 156 – 171, maio/ago. 2012.
3. CARVALHO, Daniela de. Nambanjin: sobre os portugueses no Japão. Disponível em: revistas.rcaap.pt/antropologicas/article/download/924/726. Acesso em 20 fev 2016.
4. DAMÁSIO, Antônio R. O erro de Descartes: Emoção, Razão e Cérebro Humano. São Paulo, Cia. das Letras, 1996.
5. EL MARGHANI, V. et al. Kansei Engineering: metodologia orientada ao consumidor para suporte a decisão de projeto. 8º Congresso Brasileiro De Gestão De Desenvolvimento De Produto. 12, 13, 14 de setembro de 2011. Porto Alegre-RS, 2011. p 1-13.
6. EL MARGHANI, V. et al. Emotional and sensation on the passenger aircraft. In: International Conference on Kansei Engineering and Emotional Research, 2012, Tainan City. KEER 2012: Green Kansei, 2012.
7. EL MARGHANI, V. et al. Engenharia Kansei aplicado no processo de Design. In: Congresso Brasileiro de Pesquisa e Desenvolvimento em Design. 2012.
8. EL MARGHANI, V. et al. Emotional Engineering vol. 2. Kansei Engineering: Methodology to the Project Oriented for the Customers. In: Shuichi Fukuda. (Org.). London: Springer - Verlag 2013.
9. GRUPO STELA. Guia de preparação de artigos. Florianópolis: UFSC, 2004. Disponível em: <http://www.labcon.ufsc.br/dowloads/33.pdf>. Acesso em: 06 abr. 2016.
10 HEECHEON, Y. et al. Development of customer satisfaction models for automotive interior materials. International journal of Industrial Ergonomics, v. 36, p. 323-330, 2006.
11 JINDO T.; KIYOMI, H. Application studies to car interior of Kansei engineering. International journal of Industrial Ergonomics, v. 19, p. 105-114, 1997.
12 JINDO, T. et al. A study of image recognition on Kansei Engineering. Elsevier Science Journal, Vehicle Research Laboratory, Nissan Laboratory Center, Nissan Motor Co. Ltda. Yokosuka, Japan, 1995.
13 KONSTANTINO, S. et al. Defining perceived quality in the interior automotive industry: an engineering approach. Procedia CIRP, v. 36, p. 165-170, 2015.
14 NAGAMACHI, M. Kansei/ Affetive Engineering and History of Kansei Engineering in the World. In: Nagamachi, M. (Ed.). Kansei/ Affective Engineering. Boca Raton: Taylor & Francis, 2011.Cap. 1 p. 1-13. ISBN 978-1-4398-2133-6.
15 SANTOS, M. et al. Flight attendent uniform concept preference study usign kansei ergonomics. KEER, International Conference on Kansei Engineering and Emotional Research, March 4-10, Paris, 2010.
16 SHÜTTE, S. et al. Affetive meaning: The Kansei engineering approach. Elsevier Science Journal, v. 20, p. 477-496, 1997.
17 SHÜTTE, Simon. Designing Feelings into Products: Integrating Kansei Engineering Methodology in Product Development. 2002. 115f.
18 Tese (PhD) - Course of Integrating Kansei Engineering Methodology inProduct Development, Departament of Mechanical Engineering, Linköpings Universitet, Linköping.
19 TANOUE, C. et al. Kansei Engineering: A study a perception of interior vehicle image. International journal of Industrial Ergonomics, v. 19, p. 115-128, 1997.

20 VÁZQUEZ, Adolfo Sánchez. Convite à Estética. Rio de Janeiro: Civilização Brasileira, 1999.
21 VERRI, Marcos. Métodos da Engenharia Kansei para a mensuração do espaço semântico. 2015. 220 f. Dissertação (Mestrado) - Universidade Federal do Paraná, Curso de Pós-Graduação em Design de Produto.

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