LUND UNIVERSITY

Exploring emotions for design of your future chair

Sperling, Lena; Kristav, Per; Olander, Elin; Lekeberg, Hans; Eriksson, Joakim

2006

Link to publication

Citation for published version (APA):
Sperling, L., Kristav, P., Olander, E., Lekeberg, H., & Eriksson, J. (2006). *Exploring emotions for design of your future chair*. Paper presented at the 5th international scientific conference Design & Emotion.

Total number of authors:
5

General rights
Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.
• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: https://creativecommons.org/licenses/

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

In: Proceedings of the International Conference ”Design & Emotion” at Chalmers University of Technology, Gothenburg, Sweden

Exploring emotions for design of your future chair

Lena Sperling
Industrial Design
Department of Design Sciences
Faculty of Engineering LTH
Lund University
P.O. Box 118, SE-221 00 Lund, Sweden
Phone: 46 +46-222 76 23; Fax: +46 46-222 80 60
lena.sperling@design.lth.se

Per Kristav
Machine Design
Department of Design Sciences
Faculty of Engineering LTH
Lund University
P.O. Box 118, SE-221 00 Lund, Sweden
Phone: 46 +46-222 85 15; Fax: +46 46-222 80 60
per.kristav@design.lth.se

Elin Olander
Industrial Design
Department of Design Sciences
Faculty of Engineering LTH
Lund University
P.O. Box 118, SE-221 00 Lund, Sweden
Phone: 46 +46- 222 36 33; Fax: +46 46-222 80 60
elin.olander@design.lth.se

Joakim Eriksson
Ergonomics & Aerosol Technology
Department of Design Sciences
Faculty of Engineering LTH
Lund University
P.O. Box 118, SE-221 00 Lund, Sweden
Phone: 46 +46-046-222 80 15; Fax: +46 46-222 4431
Joakim.eriksson@design.lth.se

Hans Lekeberg
Industrial Design
Department of Design Sciences
Faculty of Engineering LTH
Lund University
P.O. Box 118, SE-221 00 Lund, Sweden
Phone: 46 + 704-743630; Fax: +46 46 222 80 60
hans.lekeberg@gmail.com

In: Proceedings of the International Conference ”Design & Emotion” at Chalmers University of Technology, Gothenburg, Sweden

Exploring emotions for design of your future chair

Lena Sperling, Per Kristav, Elin Olander, Joakim Eriksson and Hans Lekeberg
Department of Design Sciences, Faculty of Engineering LTH, Lund University,
Lund, Sweden

Abstract: The User Compass Chart (UCC) was used for eliciting middle-age subjects' experiences of 33 photo-represented easy chairs, including consumer products and chairs designed for nursing-homes as well as institutions in general. The chairs were represented in black and white photos measuring 50 x 50 mm. The vectors used in the chart were *most inviting - most repellent* and *most homelike- most nursing-home like* associating adjectives. Subjects were asked to position each representation on the chart, according to hers/his emotional experiences and to think-aloud. When the UCC was complete the subject had the possibility to adjust the positions of the representations. The experiments were recorded with video and digital camera. Key-sentences were transcribed. The positions of all subjects' markers were summarised in "flag diagrams" for each represented chair and frequencies were compared of different products in different sectors. Key sentences of significant products and sectors were classified according to design elements (defined elements or whole body) and products values (functional and ergonomic or appearance and image). Some chairs were identified as more significant (homelike and inviting, institutional and inviting, institutional and repellent). The UCC proved to be a stimulating and useful tool, and some product qualities could be recommended on basis of the results.

Key-words: Design elements; inclusive design; elderly; chairs; emotional design methods

Introduction

The proportion of elderly people is growing in the industrial countries. An increasing percentage of elderly and disabled persons will continue to live in their habitual homes, as accommodation in service units and nursing homes will not be sufficient. Designs considering both physical and psychosocial characteristics of elderly people may improve the quality of life by promoting independence as well as safety, usability and attractiveness of the residence (Demirbilek and Demirkan, 2004). Rising from a chair is a task essential for independent living (Hughes et al 1996) and is thought to be the biomechanically most demanding functional task (Riley et al, 1991). Consequently a salutogenic approach to the design of chairs and other seating furniture is most important for an active life and independence in old age.

In the industrial countries, many of today's middle-age consumers - the future elderly users - have a considerably better economy compared to previous generations and invest in more advanced and pleasurable products. Failure to understand the differences between cognitive and chronological age has created problems for marketers, and new products with great potential to improve the lives of elderly consumers have been rejected, because they become symbols of age and therefore are inconsistent with the self-image of many elderly (Lunsford and Burnett, 1992). Emotional aspects of furniture for elderly have not attracted the same interest as the functional dimensions. An "Autumn Chair" was designed for ambulatory elderly and incorporated many features to accommodate this population and was also mentioned as a success in universal design (Christopher and Harp, 2002). Affective user satisfaction of design variables of a large number of office chairs was studied with expert subjects rating their satisfaction of 13 specific dimensions defined with adjectives (Park and Han, 2004). Results were analysed with a fuzzy rule-based approach. In the present study of emotional dimensions of easy-chairs we wanted to explore qualities beyond traditional design elements for application in industrial design practice, by means of the mediating tool "User Compass Chart", UCC, (Sperling and Eriksson, 2006). The overall aim of the present study was to contribute to the design of home furniture which appeals to middle-age consumers and

has functional qualities for use in older age. The aim of the present study was to (1) explore visual design elements of easy-chairs, (2) propose design elements for attractive and home-like easy-chairs for aging users and (3) to further practice and evaluate the UCC as am mediating tool in communication with consumers.

Methods and procedure

A gross list was compiled of Scandinavian chairs (arm- and easy-chairs) from the internet in autumn 2005. Products on rockers, wheels and rolls were excluded. Thirty-three chairs were finally selected for the study. They included chairs designed especially for elderly persons or for use at institutions; chairs which seemed to meet functional requirements of elderly persons (easy to sit down and rise, comfortable to sit) and modern arm- and easy-chairs in general. Images of the selected products were mounted on cardboard markers sized 50 x 50 millimetres, thickness two millimetres. All products were represented with neutral covering and in black and white only, in order to focus on shape and form elements (Figure 1). The subject’s task was to characterise each represented product by positioning the marker at a relevant location on the UCC (Figure 2). The chart-points *most inviting* (with the associations attractive, appealing, nice) and *most repellent* (unattractive, ugly) were used in the North-South and the vectors *most homelike* (private, consumer-like) and *most nursing-home like* (public, institutional) were used in the East-West dimension of the UCC. This meant that the project’s target sector was located in North East. The UCC board measured 50 x 50 centimetres and had groove-milled lines, with a neutral zone in its central part. The lines of the vectors and the corresponded to the VOICE scale (Volvo Car Corporation 1986).

Twelve able-bodied subjects aged between 50 and 64 took part in the study, women and men equally distributed over ages. Eight of them were university employees not involved in industrial design or ergonomics, and four were external persons from industry and society. Two of the female subjects had been impaired due to back-pain and stroke, facts that were unknown to the researchers when recruiting participants to the study. The experiments took place in a usability laboratory and were video-recorded. It was explained to the subject that the experiment regarded her/his personal feelings around the products. The pictures were presented one at a time and in an individually randomised order. The subject was asked to “think aloud” about the represented chair and to position the marker at a relevant location on the UCC. When all images were positioned, the subject was allowed to adjust the positions in relation to each other. The resulting image board was documented with a digital camera. The recorded experiments were listened to and key sentences documented in writing. The positions of all subjects’ markers were summarised in “flag diagrams” for each represented chair (Figure 3) and frequencies were compared of different products in different sectors. Repeated experiments with one and the same person (Olander and Sperling 2006) demonstrated that intra-individual differences in positioning of the images were too large to motivate a more detailed statistical analysis. For products of the highest coincidence in one and the same of the four main sectors, key sentences were classified according to design elements (defined elements or whole body) and products values (functional and ergonomic or appearance and image).

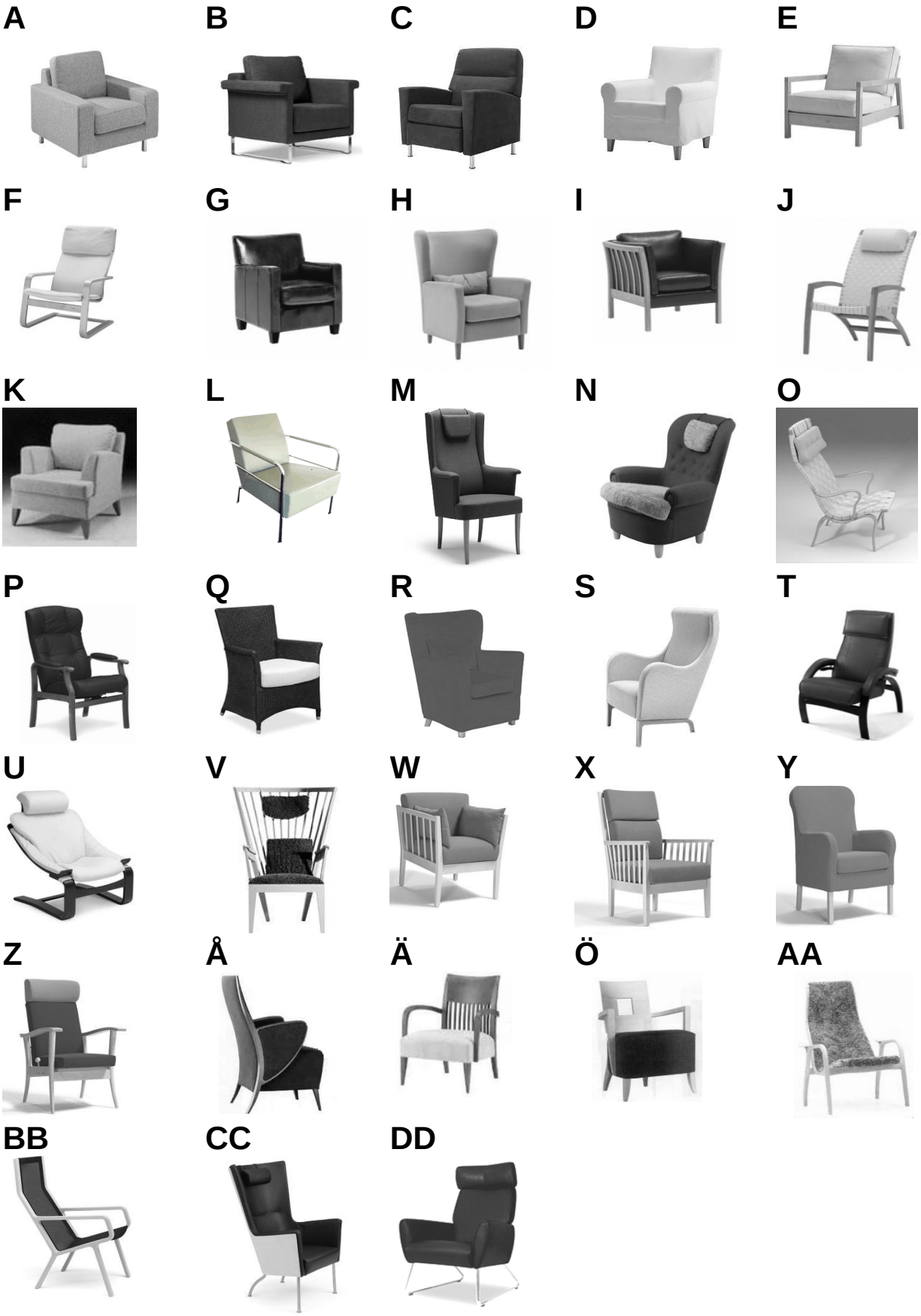

Figure 1. Photo-represented products in study of visual qualities of chairs.

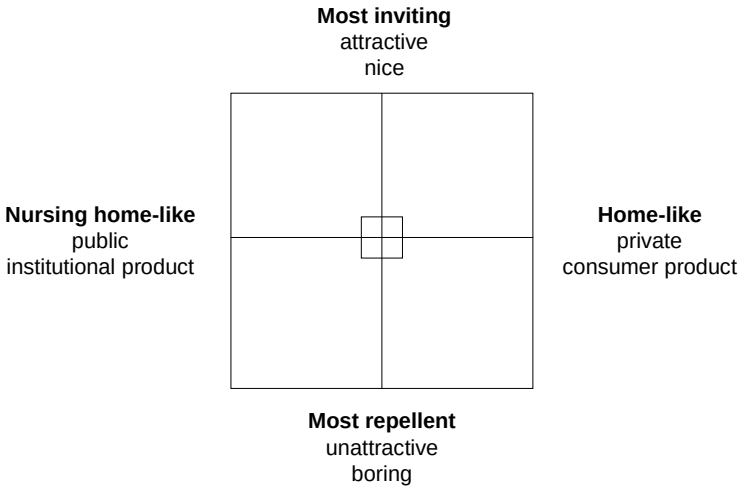

Figure 2. Labelled chart-points of the User Compass Chart in study of easy-chairs.

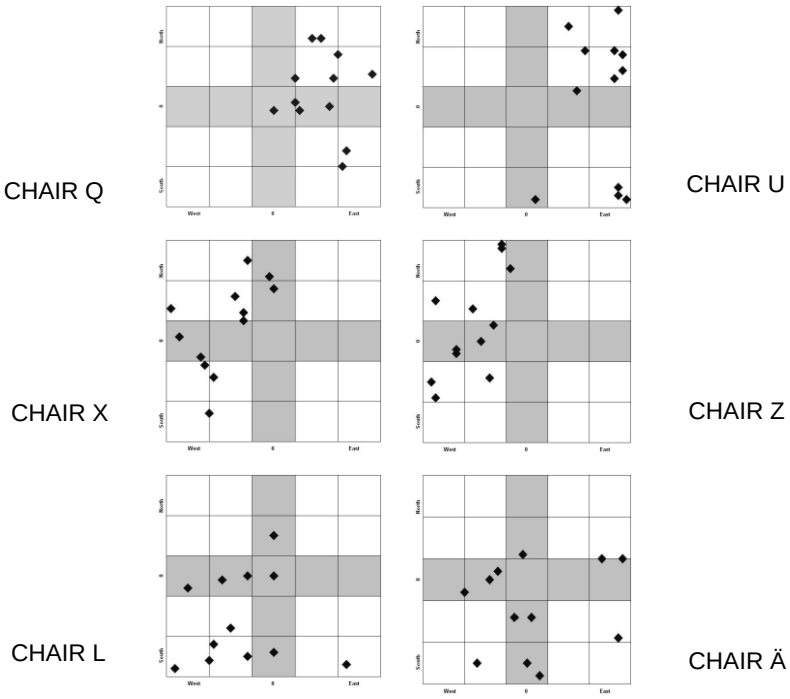

Figure 3. Compass charts of the six chairs with highest coincidence in one and the same sector. Each cross represents a categorisation by one subject (N=12).

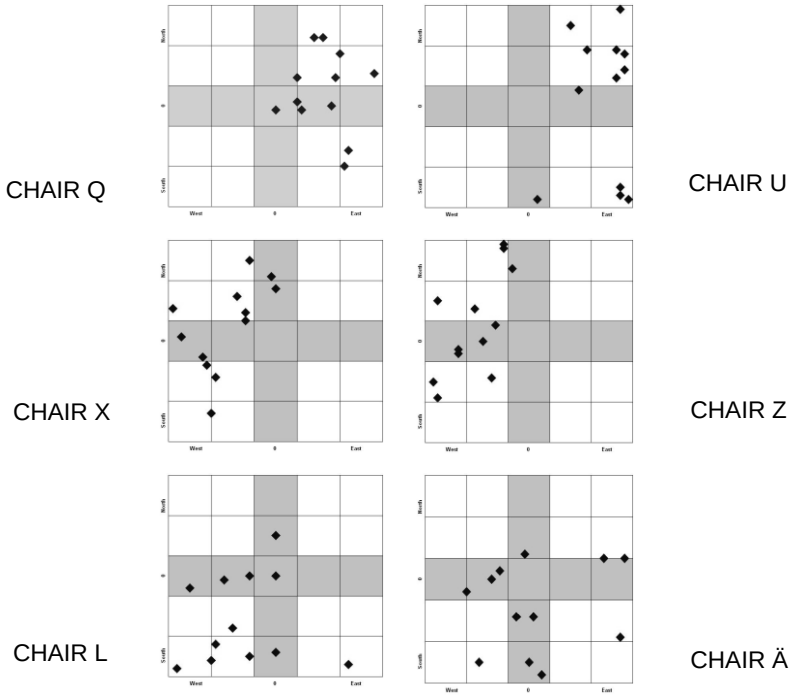

Figure 3. Compass charts of the six chairs with highest coincidence in one and the same sector. Each cross represents a categorisation by one subject (N=12).

Results

The differences in location of markers were large both between subjects and the represented products (Figure 3). The most frequent chairs in the North-East target sector (Home-like and inviting) were the rattan chair Q and the reclining resilient chair U. All subjects characterised these products as home-like except for two persons who were indifferent. Two chairs with high back-rests (X and Z) were almost completely categorised as chairs for nursing homes and institutions. About half of the subjects regarded these chairs as inviting. The chair L with a steel frame was positioned in South West, repellent and institutional, by five subjects. The chair Ä with a curved wooden backrest and open sides was regarded as repellent or nearly repellent by all subjects, and this chair seemed to relate both to private home and nursing environments. “North-East” subjects gave more comments on the whole chair body than on defined design elements when reflecting about the two most homelike and inviting chairs (Table 1). Comments on functional and ergonomic values and appearance and image values were equally distributed in both chairs. The reclining chair U was described with functional values as “nice to sit in, comfortable, relaxing, for resting” and with appearance and image values such as “beautiful wood-work and shape, lovely, cosy, not for elderly but for young people”. The rattan chair Q was described with functional values such as “comfortable”, but also in terms of sound and cleanability. Five subjects associated the chair with a garden or veranda context. Subjects seemed to associate both products with recreation, comfort and leisure time. The two chairs categorised as institutional and at the same time inviting (Z and X) generated many comments on defined design elements as well as on the chairs as whole bodies (Table 2). Appearance and image values dominated the subjects’ comments. Significant design elements mentioned were: Armrests and sides, backrest, control for adjustability and materials. Subjects associated the products with elderly persons, public and caring units, boredom and passivity. A steel-chair (L) was characterised as mainly

institutional and repellent. Comments demonstrated that almost all subjects associated this product with public environments such as waiting rooms and with young persons rather than with themselves (Table 3). Significant design elements were the simple pads and the thin steel-frame. The mainly repellent open-sided wooden Chair Ä was described as hard and uncomfortable, disproportionate, boring and old-fashioned. The two subjects with previous impairment expressed mainly functional and ergonomic product values, with associations to hospitals and caring units.

Table 1. Reflections about chairs characterised as mainly homelike and inviting. Comments by subjects who positioned the markers in and close to the North-East sector of the UCC.

Chairs	Values	Comments
U	Functional and ergonomic	*Whole body:* Nice to sit in, elastic design, relaxing. You may swing in it, comfortable. It is probably resilient. For rest, not for reading and so. Watching TV.
	Appearance and image	*Defined elements:* Bent wood is nice. Beautiful wood-work and shape. Whole body: Lovely. Very nice chair in homes. Cosy. Not boring. Elderly and persons in hospitals do not sit like that. For young people.
Q	Functional and ergonomic	*Defined elements*: High back and seat, inviting. Comfortable with a thick cushion. *Whole body:* Rather comfortable. Sounds a lot. Difficult to clean.
	Appearance and image	*Whole body:* Rather nice. Cosy, rather funny. In a garden room, plaited rattan is veranda-like. Modern version of chairs of the 50s. In a summer house. On the terrace (rattan). More or less outdoors.

Table 2. Reflections about chairs characterised as mainly institutional and inviting. Comments by subjects who positioned the markers in and close to the North-West sector of the UCC.

Chair	Values	Comments
Z	Functional, and ergonomic	*Defined elements:* Easy to rise with help of the armrests. Adjustability increases credits. *Whole body:* Comfortable for your back. May be good to sit in. Looks hard.
	Appearance and image	*Defined elements:* The straight backrest reminds about nursing environments. Armrests and backrest are nursing-home like. I like this one, slender, high back, good armrests. High legs make it look public. Adjustment is probably good, but not with a ball-shaped lever, does not look very nice. Has a control, but that is no bad signal! Adjustable, for a nursing unit. *Whole body:* In a caring environment, comfortable for elderly. Pleasant. Appearance, shape and function adequate for elderly. Not bad, nice. Stabile and simple. Unusually pleasant for a nursing environment. Fitting unusually well in a public environment. Boring, conventional. You find it at institutions. I would not have it, it is not cosy enough. It is public as it has not got details. Just a chair. Not very beautiful. A chair in homes for the aged. Ugly but probably comfortable. I thought it was a rocking chair.
X	Functional and ergonomic	*Defined elements:* Hard sides due to plenty of wood. Bruises by the edgy armrests. Easy to rise, straight back. *Whole body:* Easy to clean, comfortable.
	Appearance and image	*Defined elements:* Better easy-chair proportions with the high back-rest (compared to W). Backrest looks institutional but has a strict appearance. Not very beautiful trellis. *Whole body:* I recognise it from the hospital. Strict. Rather attractive, nice to sit in waiting for something. Public authorities, looks nice. In a home for the aged. Some old person sits there, waiting. In a waiting room.

Table 3. Reflections about chairs characterised as mainly institutional and/or repellent. Comments by subjects who positioned the markers in and close to the South-West and/or South-East sector of the UCC.

Chair	Values	Comments
L	Functional and ergonomic	*Whole body:* Not very comfortable.
	Appearance and image	*Defined elements:* Just two pads and armrests! The armrests make it a bit sterile and consequently public. Steel is ugly, thin and sterile. Looks hard and cold because of the steel-tubes. Institutional because of the steel frame, *Whole body:* A strongly square design. Strict without frills, not very nice. Rather gloomy. For young persons? Expresses confidence and efficiency. Typical for a waiting room.
Ä	Functional and ergonomic	*Defined elements***:** The backrest does not look comfortable; wooden armrests are hard. *Whole body:* Uncomfortable.
	Appearance and image	*Defined elements:* The arm-rests are slender. Thin legs, does not look very good. Looks clumsy due to the width and depth of the seat. *Whole body:* Conventional. No big exclamation marks. Old-fashioned, old shape. For homes of elderly. Somewhat boring. Perhaps institutional. In homes from the 1950-60s.

Discussion

The UCC was initially designed as a game-board with two crossing rating scales. Compared to conventional static and one-dimensional questionnaires for customer satisfaction ratings, the two-dimensional UCC seems to be more dynamic and most useful mediating tool. Subjects got the possibility to adjust the positions of markers at the end of the experiment and did minor as well as major adjustments but rarely between the four main sectors. The adjustability of ratings is one of the greatest advantages of the presented mediating tool. The verbal headings of the chart-points may be discussed. They were chosen in consensus by the two initial researchers of the study. During the experiments we found that they were not exactly opposite and consequently we had to instruct subjects that they should regard them as opposite. For future studies we recommend a more thorough selection of headings by use of the Semantic Product Analysis (Wikström 2002). In the present study, which was our second application of the UCC, only twelve subjects participated. Using key sentences for inspiration in design work, a limited number of subjects is relevant. In order to more exactly analyse how different design elements affect users a larger group of subjects is necessary.

Consumer studies with photo-represented products in black and white are not comparable to experiments with real full-scale objects such as in the study of office chairs (Park & Han, 2004). However, consumers today often get their first impression of a product at the internet or in newspapers or home magazines, and thus experiments with pictures seem relevant. Reflections about products were expressed both in terms of defined elements and the chair as a whole, but the proportion of whole-body comments was larger in the present study than in the study of office chairs (Park & Han, 2004). This could be an effect of using small pictures in the present experiment. In industrial design, both defined and holistic design variables are important, which was confirmed by the fact that an industrial designer used both categories as inspiration in his design of a more appealing and pleasant easy-chair (Lekeberg, 2006). Compared to Kansei Engineering (e.g. Nagamachi, 1995, 2002), which is an established process for managing consumer needs and feelings in product development in large companies, a design process based on the User Compass Chart could contribute to a new holistic approach of specific importance to industrial designers, using the tool for evaluation of sketches and models towards a target defined by a client.

There are good functional reasons for the appearance of existing chairs for elderly and for use in nursing units: high legs, high and straight back, pronounced and straight armrests, and such design elements have become icons. In general, products experienced as institutional got more comments associated with boredom and inactivity than products associated with a private home. Hard materials and edges seem to be frequent in institutional chairs but are perceived as repellent and unfriendly. In the present study the institutional chair X with trellis sides, was regarded as pleasant in an institutional context by some users but definitively not in home environments. Adjustability was regarded institutional in positive words, but should not have the shape of a ball on a lever. Other solutions with positive associations should instead be aimed at. Beautiful wood-work was appreciated by subjects in the present study. A material such as rattan gave several associations to garden life, verandas and summer. However, metal frames and square design elements should be avoided, at least for design aiming at today’s middle-aged consumers. Knowledge about which design elements and whole-body shape that attract, must be combined with functional requirements of aging persons. For industrial designers it should be a great challenge to create pleasurable and functional easy-chair for users of all ages and possible to use during long time, contributing to a sustainable society.

Conclusions

The User Compass Chart seemed to be a dynamic and useful mediating tool, with the adjustability of ratings as one of its greatest advantages. The inter-individual differences were large in positioning of the photo-represented products and could be reduced by a better semantic process in selection of headings and a larger number of subjects. A large amount of reflections was generated by the participants and some preliminary recommendations could be presented.

Acknowledgements

The study was financially supported by Stichting IKEA Foundation.

References

Christopher, B. and Harp, A. (2002) “Chair features principles of universal design”. FDM Journal, 74(5): 64-67.

Demirbilek, O. and Demirkan, H. (2004) ”Universal product design involving elderly users: A participatory design model”. Journal of Applied Ergonomics Volume 35(4): 361-370.

Hughes, M.A., Myers, B., and Schenkman, M. L. (1996) “The role of strength in rising from a chair in the functionally impaired elderly”. Journal of Biomechanics 29(12): 1509-1513.

Lekeberg, H. (2006) ” Twelve consumers’ reflections about 33 chairs. Reflections selected for direct implementation in design and to consider in coming design stages of a future easy-chair”. Report in manuscript. Industrial Design, Design Sciences, Lund University, Lund, Sweden.

In: Proceedings of the International Conference ”Design & Emotion” at Chalmers University of Technology, Gothenburg, Sweden

Lunsford, D.A. and Burnett, M.S. (1992) “Marketing Product Innovations to the Elderly: Understanding the barriers to adoption”. Journal of Consumer Marketing 9(4): 53-64.

Nagamachi, M. (1995) “Kansei Engineering. A new ergonomic consumer-oriented technology for product development”. Journal of Industrial Ergonomics 15(1):13-24.

Nagamachi, M. (2002) “Kansei Engineering as a powerful consumer-oriented technology for product development”. Applied Ergonomics 33(3): 289-294.

Olander, E. and Sperling, L. (2006). Exploring desirable and avoidable product qualities for a universal design easy-chair. Paper accepted for presentation at the International Universal Design Conference in Kyoto 2006.

Park, J. and Han, S.H. (2004) “A fuzzy rule-based approach to modelling affective user satisfaction towards office chair design”. International Journal of Industrial Ergonomics 34(1): 31-47.

Riley, P. O., Schenkman, M. L., Mann, R. W. and Hodge, W. A. (1991) “Mechanics of a constrained chair rise”. Journal of Biomechanics 25(4): 77-85.

Sperling, L. (2005). “Ergonomics in user-oriented design”. In Holmér, I., Kuklane, K. and Gao, Ch. (eds). *Proceedings of the 11th International Conference Environmental Ergonomics.* Thermal Environment Laboratory, Lund University, Lund, Sweden.

Sperling, L, Eriksson P. (2006). “Material qualities in present and future interiors of cars and trucks”. In: P. D. Bust (Ed) Contemporary Ergonomics. Taylor & Francis, London.

Wikström, L. (2002). The message of the product. Methods for evaluation of products’ semantic functions from a user perspective. Doctoral dissertation in Swedish. Chalmers University of Technology, Gothenburg, Sweden.

Volvo Car Corporation (1986). Some questions to you as a Volvo driver. Quality Staff, VCC, Göteborg, Sweden.