Industrial Design Research

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ERA 05 World Design Congress
ICSID/Icograda/IFI Educational Workshop
Ingvar Kamprad Design Centre, Lund

Arranging and hosting international design conferences is an important means of positioning Industrial Design in Lund on the international map. In September 2005, the educational workshop Exploring Change – Design Education in the new Era took place in the Ingvar Kamprad Design Centre at LTH, as a regular and parallel session of the ERA 05 World Design Congress in Copenhagen. Our commission handled both the scientific programme with international speakers and the complete organisation of the event. The workshop was very successful and attracted almost 200 national and international participants, researchers as well as teachers.

Meeting international actors within the design area at design conferences is very important for a young research group as ours. We have up to now submitted, presented and published results of our research at international conferences in Sweden, Denmark, Finland, Norway, Italy, the United Kingdom, Turkey and Japan.

1/ Gunilla Jönson, Rector of LTH , Professor, Packaging Logistics, Lund University, Sweden 2/Participants in the auditorium, IKDC 3/ Claus-Christian Eckhardt, Professor, Industrial Design, Lund University, Sweden 4/ Patrick Whitney, Professor, Illinois Institute of Technology, Chicago, USA 5/ Lorraine Justice, Professor, Head of the School of Design, Hong Kong Polytechnic University, China 6/ Christoffer Barnekow, Journalist, Moderator and Yrjö Sotamaa, Professor, Rector of University of Art and Design, Helsinki, Finland 7/ 8/ Lunch 9/ 10/ 11/ Visit to the Industrial Design master projects exhibition at Skissernas Museum, Lund.


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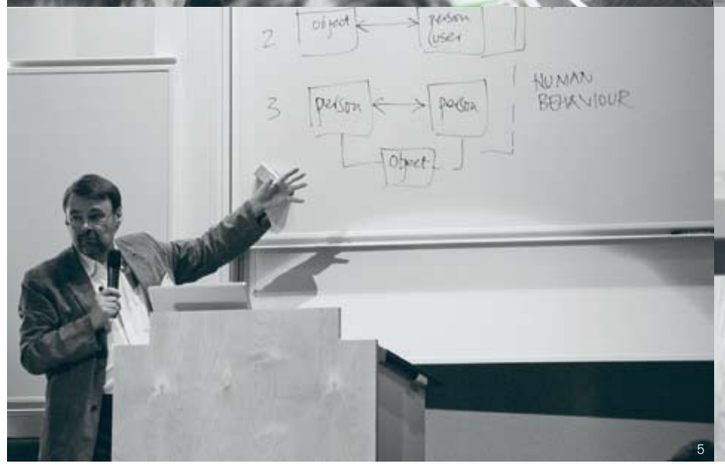

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ERA 05 World Design Congress
ICSID/Icograda/IFI Educational Workshop
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1/ Lars Engman, Design Manager, IKEA of Sweden, Älmhult, Sweden 2/ Bill Moggridge, conference visitor 3/ Paul Hekkert, Professor, Delft University of Technology, Netherlands 4/ Tom Waldner, Design Manager, Tetra Pak, Lund, Sweden 5/ Mike Stott, Professor, Interaction Design, Umeå Institute of Design, Sweden 6/ Axel Thallemer, Professor, Industrial Design, Kunstuniversität Linz, Austria 7/ Conference visitors in the IKDC Auditorium 8/ Peter Ullmark, Professor, School of Design and Craft, Göteborg University, Sweden 9/ from left to right: Paul Hekkert, Professor, Delft University of Technology, Netherlands; Lars Engman, Design Manager, IKEA of Sweden, Älmhult, Sweden; Axel Thallemer, Professor, Industrial Design, Kunstuniversität Linz, Austria; Lorraine Justice, Professor, Head of the School of Design, Hong Kong Polytechnic University, China; Yrjö Sotamaa, Professor, Dean of University of Art and Design, Helsinki, Finland; Cheryl Akner-Koler, Professor, Industrial Design, University College of Arts, Crafts and Design, Stockholm, Sweden 10/ Kristina Salqvist, Assistant Professor, School of Design and Craft, Göteborg University, Sweden 11/ Lisbeth Svengren-Holm, Assistant Professor, School of Economics, Stockholm University, Sweden 12/ Claus-Christian Eckhardt, Professor, Industrial Design, Lund University, Sweden; Christoffer Barnekow, Journalist, Moderator



ENGAGE 2006

Ingvar Kamprad Design Centre, Lund

The Engage network decided that IKDC in Lund would be a perfect venue for the Engage International Open Event III in the Design Centre September 2006, the final event to be visited by the project reviewers from Brussels.

The Engage event attracted more than 100 visitors from universities and industry and was also regarded as very successful by the participants. In December 2006, the Swedish Engage partners Linköping University of Technology, Lund University and Chalmers University of Technology arranged a national event, The right feeling – About affective design, at the Konstfack University College of Arts, Craft and Design in Stockholm, endorsed by the ESS (Swedish Ergonomics Society), SVID (the Swedish Industrial Design Foundation) and Vinnova (the Swedish Governmental Agency for Innovation Systems).

## Why research in industrial design?

Lena Sperling

### Why research in industrial design?

From an international perspective, industrial design is a rather new subject of scientific research, and in Sweden it started only some years ago. Scientific research means construction of knowledge and has been, for some decades now, carried out about industrial design in design management, engineering, architecture and design history, but not yet very much in, for and by industrial design. Artistic development of material artefacts has gone on at schools of art and crafts for a long time, but the created objects are usually not formed with constraints from industrial processes or user requirements. Scientific research in industrial design is important for industry, society as well as the academic realm itself: Research-based creative methods and tools will hopefully enable industrial designers to carry out their complex work, resulting in innovative artefacts or improved products. Desirable, useful, functional and sustainable products will contribute to pride and pleasure in daily life. From a scientific point of view, it is of great interest to describe and understand how the industrial designer's professional knowledge and skill is constructed, as there are many similarities between design thinking and research. The industrial design education at Lund University is based on scientific research, and especially in the core subject, it is important to have a scientific foundation.

### Cornerstones of research and research education in ID

The establishment of research in ID was made possible by the financial agreement between LTH and the Stichting IKEA Foundation, where it was stated that research and research education should be carried out in industrial design on a high scientific level and in an international cooperation. The framework of ID research in the context of the Department of Design Sciences was discussed, and the embryonic division of industrial design decided to define its research by the "three M´s" (Figure 1): *Methods* (methods, tools and processes), *Meta-qualities* (emotional aspects and symbol values of products) and *Management* (design management and trend management) and the research embryo started to grow. The vision was and is still to integrate creative "form-giving" with scientific research, to take the best from both worlds and do something new that other research groups in ID do not yet do.


Figure 1.

The "three M's" of research in industrial design at Lund University: *Methods* (methods, tools and processes), *Meta-qualities* (emotional aspects and symbol values of products) and *Management* (design management and trend management).

In Spring 2003, Lena Sperling, interior designer, PhD and associate professor in consumer technology, got a position as assistant professor in ID and the responsibility to build up research in ID in collaboration with Professor Claus-Christian Eckhardt, Industrial Design and Professor Robert Bjärnemo, Machine Design, these persons forming the obligatory group of three qualified scientific supervisors. In September 2003, it was decided to accept ID as a regular subject of research and research education and the definition of the subject and the study plan were published in the research directory of LTH[1]:

"Research and research education in industrial design at Lund University regards innovative design of products aimed at industrial production, considering needs related to humans and environment. The design process is studied from vision to product, and the holistic synthesis of functional, aesthetical and emotional dimensions is of central importance. Research in industrial design shall give deepened insight in relations between humans and products as well as in the creative form-giving from a life cycle perspective. Research in ID also aims at developing science-based knowledge, methods and processes of advantage for the complex profession of the industrial designer. The doctoral students shall in their work focus on one of the 'three Ms' ".

After this important milestone, Elin Olander and Eva Wängelin, both industrial designers educated at LTH, became as the first two PhD students in ID. In spring 2006, Lisbeth Svengren-Holm, econ dr. in Design Management and assistant professor at Stockholm University School of Business, joined us as a visiting researcher and a Lise Meitner professor, and in autumn 2006 also Despina Christoforidou, BA in Art Science as well as Media and Communication, assistant teacher and researcher already employed at the division, could be accepted as a PhD student. They will all present their research later in the present chapter.

### Research schools and networks

To be part of research schools and networks is most valuable for a new and small group of PhD students in industrial design. Up to now, our ID research seminars have been internal and open only to some other PhD students of the Department, especially when international researchers in and around ID have been invited. The Department of Design Sciences may be seen as a local research network, but the research questions of our PhD students differ from most of the other research students of the Department, who are more oriented towards human factors and engineering. Elin Olander is a member of and partly financed by the *Research School of the Vårdal Institute*[2], which is a national environment for research and development in the field of health care, and up to now, she is their only PhD student with a background in industrial design. The interimistic national research school initiated by the *D&R Swedish Design Research Network*[3] provides our PhD students in industrial design with a larger research community especially in design theory, and they take part in courses and seminars. Design & Research will apply for financial support in order to establish a permanent research school with possibilities to take part in workshops and seminars and to present their research. Another important and very vital community for our PhD students is the *Nordic network for research on communicative product design, NordCode*[4]. The network gathers active researchers and doctoral students who work on communicative aspects of artefacts, aesthetic qualities of physical products and objects, and related design processes. The ID PhD students have participated in most of their workshops and seminars.

### Establishing research in user-centred design

The financial agreement between the Stichting IKEA Foundation and LTH means a focus on user-centred design, function research and home products, but projects are also carried out within other areas of interest and with other economic sources. Although projects with external funding are often dedicated to specific themes, generic research methods, tools and processes are elaborated and tried within such projects, contributing to the personal thesis work of the PhD students. The first project financed by the Stichting IKEA Foundation aimed at establishing research in industrial design, and other PhD students from supporting subjects of the Department of Design Sciences were involved. Eva Wängelin and Despina Christoforidou mapped the degree of communication with users in Swedish furniture and lighting industry[5] in ID consultancies respectively[6, 7] and found that end-user communication was very scarce in both categories of companies. Consequently, it was most relevant to start mapping and evaluation of different mediating methods and tools in various fields of research and to try them in empirical research. Promising methods were tried and further developed by the researchers, such as cultural probes[8,9] and new mediating tools were elaborated for application in products for the re-creative home, such as the internationally acknowledged User Compass Chart, the background, development and applications of which will be particularly described in specific projects below.

### International research projects and cooperation

Also internationally, a broad research front within ID and industrial design engineering concerns mapping, evaluation and development of tools for communication with consumers/users, such as in the Coordination Action *ENGAGE – Designing for Emotion*[10] that is financed by the 6th European Framework. Although functionality has always been, and will remain, an essential precondition for product satisfaction and market success, in today's culture there is evidence of the increasing importance of product experience as a driving force of product acquisition and use. The ENGAGE consortium consists of 21 project partners from nine countries, and ID at Lund University is one of them. The partners are presented as leading players in the field of affective design in Europe. The aim of ENGAGE is to provide the European industry with the means to design with full consideration for consumers' subjective and emotional lifestyle needs. In the project, gaps in current methods and tools are identified and future research in this area is promoted.

1/ http://www.lth.se/utbildning/forskarutbildning/studieplaner/allmstudieplaner/?fid=25 2/http://www.vardalinstitutet.net 3/ http://www.svid.se 4/ http://nordcode.tkk.fi
5/ Wängelin E, 2004. Industrial conversation x 9 (Industrisamtal x 9). Report in Swedish. Division of Industrial Design, LTH, Lund University. 6/ Christoforidou D, 2004. Interviews with practicing industrial designers about communication with users in their design work (Intervjuer med industridesigner om kommunikation med brukare i designarbetet). Preliminary report in Swedish. Division of Industrial Design, LTH, Lund University. 7/ Sperling L, Christoforidou D, Olander E, 2005. Communication with users in industrial design activities. Educational report, Division of Industrial Design, LTH, Lund University, Lund, Sweden 8/ Kristav P, 2005 9/ Kristav P, 2005 10/ www.designandemotion.org/society/engage

It is of great advantage for industrial design at LTH to get the opportunity to take part in the network and to calibrate its research with that of other universities. The project will end when the 6th Framework Programme closes in December 2006, but some of the partners plan to continue their cooperation in coming projects and programmes.

LTH has since 2003 a cooperation agreement with *Kyushu Institute of Design* in Fukuoka in Japan, and at a visit in Fukuoka in October 2006, we expressed our mutual interest to accelerate our collaboration in research and to facilitate exchange of researchers and master students. A research field of common interest both to researchers of ID in Lund and Fukuoka is methods and tools for communication with users in inclusive design. At least in Japan, inclusive design means more design thinking than universal design that follows the "seven principles of universal design" more strictly in design of accessible environments. Both approaches aim at usability and accessibility to the greatest extent and for as many users as possible. Elin will present more about this in a separate chapter below.

National research cooperation

During 2001-2004, a large scale research-based universal design intervention took place in all master programmes in architecture, industrial design, interior design and landscape planning, the *Universal Design Educational Project Sweden (UDEP-S)*[11] and ID at LTH was represented in the initiative group. UDEP-S was appointed a *Centre of Excellence* in "Design for All", within the European Information Society. The UDEP-S programme contributed both to our education and research[12] and was a very important community of teachers and researchers and we have continued our cooperation with some of them. The intervention was presented at educational and scientific conferences in Sweden and abroad, such as *INCLUDE* 2005 at the Royal College of Art in London and finally documented in a book[13].

LTH has invited its ID researchers to participate in the research programme PIE-p, Product Innovation Engineering Programme, which was launched in December 2006 and aims at strengthening Swedish power of innovative product and business development. The programme engages several Swedish schools and research institutes. It is managed by the Royal Institute of Technology in Stockholm and was initially developed together with LTH, the University College of Jönköping, Umeå Institue of Design at Umeå University, Centre for Technology in Health Care (CTV) and several companies and organisations. Swedish educations will be better at promoting innovations, and at the same time the climate for innovation for Swedish industry and higher education will be stimulated. The programme will result in new products and businesses, and this will be recognised by an increased number of patents, products and companies. PIE-p will continue for ten years, 2007-2016, and will have an annual budget of 50 million SEK, where VINNOVA will contribute as much as 100 million SEK in the course of ten years.

Research connections of the industrial design education

For a science-based education in ID as in Lund, it is most important to implement research in design education, and researchers in ID regularly lead or give lectures in the ID and Technical Design educational programmes. Students also take part as subjects in research studies when relevant.

During their fifth year, before the master students' diploma work, ID students take the course "Research Methods in Industrial Design". The aim of this course is to give an introduction to fundamental principles of theory of science and the research process and to present methods and models for realisation of projects of a practical as well as theoretical nature. The course gives a vision of a subsequent research career in industrial design but also supports the planning and report of the coming diploma work and also the students' future work as practising industrial designers. The course combines theoretical lectures by national and international researchers in ID with empirical studies, where the specific focus is on methods and tools for communication with users. The previous course (autumn 2005) was awarded very good credits in the course evaluation and a strong impact was seen in several diploma projects, both in the way of execution and writing.

Industrial projects

Industrial cooperation is the third commission of the university. For a research subject such as ID, it is necessary that collaboration with industry is an essential part of action. We need to work with questions of relevance to industry, and research-based methods, tools and models are important for SMEs as well as large industrial companies contributing to their design of successful products. With financial grants from regional innovation funds, we carry out several design commissions every year in companies that have not before worked with ID. In this work, we involve senior students and young industrial designers. The Department of Design Sciences has an agreement with Träriket, the Scanian "Kingdom of Wood" and, among other projects, an innovative prototype chair and a table of beech were designed by the former students Lena Beskorovainaia and Hans Lekeberg in order to promote Scanian beech as an attractive material for furniture. The project was initated and partly financed by LRF, The Federation of Swedish Farmers.

The future

During 2007, our first PhD students will be examined as a licentiate researcher and the first doctor will be examined within the next few years. In order to strengthen the artistic "leg" of our research body, we will now actively involve our ID teachers in research, as they are all practicing industrial designers. They may take part in different design experiments and also help us verify that our research-based methods and tools are relevant in practice. Involving the teachers will enrich our research and contribute to "form-giving" the PhD students' doctoral thesis work. With improved financial resources, we hope to be a larger group of senior researchers and PhD students in the next few years.

11/ http://www.universaldesign-sweden.com/ 12/ Olander E, Christoforidou D, Sperling L, 2005. Toolkit for awareness in universal design. In: R. Coleman, A. Macdonald (Editors). Include 2005. 5th International conference on inclusive design; 2005; London: Helen Hamlyn Research Centre; 2005 13/ Paulsson J (Ed), 2006. Universal Design Education. (Report about a national intervention in universal design, 250 pages). EIDD Sweden and the Swedish Association of Persons with Neurologically Disabilities, Stockholm, Sweden

## User-centred design – perspectives and projects

Lena Sperling

*User-centred design* is one of the important perspectives of ID research at LTH. User-centred design is a definition and a cluster of methods that has evolved mainly within interaction design and extended from this area to other fields of research and practice. User-centred design may be defined as design for users, “design for users with users” or design by users[1], depending on the degree of user participation. Design “with and by users” is part of participatory design. *User-oriented* is a term which denotes a perspective based on the interests and experiences of the user and on knowledge about use and users[2], and in consequence with this statement, user-oriented industrial design would be most adequate for describing our research approach in user-centred design. With users we mean the persons who are experienced in use of the intended product category. In product development as well as in design work, analysis and evaluation are the most important and critical activities for communication with users.

User requirements, expressed in qualitative terms, exist independently of solutions and are therefore an important source for innovative design. User pretentions and expectations have extended from very basic functional requirements such as safety and functionality via usability and comfort to emotional requirements such as desire, and pleasures such as physio-pleasure, psycho-pleasure, socio-pleasure and ideo-pleasure[3]. Emotional requirements are related to the individual image of users and their personal preferences, memories and dreams and form the symbol values and meta-qualities of products.

Requirements may be expressed explicitly by users, while implicit or tacit requirements may be captured, elicited or emerged[4] from users by specific methods and mediating tools. The design process can be seen as a negotiation between problem and solution through the three activities: analysis, synthesis and evaluation[5]. In analysing activities, user requirements are mapped with various physical, visual, verbal and numerical methods and tools as a basis for synthesis and evaluation In the evaluating activities, the degree of user satisfaction is measured with sketches, models and prototypes before deciding on commercialisation. Although all industrial designers use various mediating tools in communication with their clients, they seem to use them more seldom in communication with users[6, 7]. In order to increase communication with users in ID, methods should[8]:

- Be fun and stimulating; contribute to the designers’ personal creativity and facilitate innovative design.
- Be adaptable and contribute to the ID’s individual ways of working.
- Be uncomplicated and time efficient to use.
- Be experienced as natural and spontaneous.
- Utilise users’ experiences and knowledge.
- Result in figures and solutions that convince the client.
- Result in solutions which satisfy users as well as the designer.

### The User Compass Chart – a new tool in communication with users

Compass charts have their origin in psychology[9] and have long been used for positioning of existing and future products in strategic industrial development and design practice. But as far as we have found, they have not before been used in communication with consumers and end-users in design work. The User Compass Chart, UCC, was created in the interface between the “IKEA” research programme, where stimulating mediating tools were probed for, and the Vinnova-financed Bioauto project that aimed at design of demonstrators of renewable materials for the manufacture of automotive interior components. In Bioauto several automotive companies were represented, among them SAAB, Scania, Volvo Car and Volvo Truck. Together with Per Eriksson, researcher in Innovative Design at Chalmers University of Technology, we searched for a creative and stimulating mediating tool for the Bioauto project, where more challenging user requirements were needed for the design of creative “green” demonstrators. Vehicle interiors are important for pride of professional drivers and for their daily well-being, but it was not known which qualities of surface materials they appreciate in today’s vehicles, which materials will be valued by them in the future and to which degree ecological materials may be visible in their real qualities in trucks and cars. These research questions are also highly relevant in design of home furniture. 37 different material samples were characterised by ten drivers according to the vectors “more professional” – “less professional” and “more natural” – “more synthetic”. They were asked to position material pieces on the UCC and to finally adjust positions if needed. The complete UCC of each driver was documented with a digital camera (Figure 2).

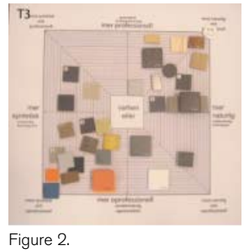


Figure 2.

Application of the User Compass Chart in the Bioauto project. A truck driver’s positioning of samples of a wide range of interior materials considering the chart points “more professional”, “more unprofessional”, “more natural” and “more synthetic”. The black dot represents the interior of driver’s present truck and the white dot with a smiley his dream vehicle.

Some material samples were more often positioned in the project’s desirable north-east sector, such as natural and imitated oak, ash and stone composites. The UCC proved to be a useful mediating tool for identification of user’s experiences[10] and it was decided by us to improve it by further application in studies of design elements of home products.

### Integrating functional and emotional requirements in innovative products for home enviromnments

In the design of products for working life, hospital care or for users with disabilities, the functional user requirements are most critical and evident, and the aesthetical qualities are often neglected or even forgotten. In the multidisciplinary research programme Elderly People and Design at the Department of Design Sciences, ID is one of several academic and industrial partners. The Comfort Living project is part of the programme and aims at the design of furniture and interiors promoting health and function. The aim of the project is the design of a sporty easy chair that attracts consumers long before they need the considered function and that may contribute to health and activity in old age. 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[11]. A regional furniture company is the main industrial partner of Comfort Living, and subcontractors and distributors are also involved in the project. One of the ID researchers has documented the research intervention as a participant observer. Elderly users were interviewed about problems and possibilities in relation to chairs by an industrial designer educated at LTH, and the User Compass Chart was used in experiments about experiences of a wide range of different arm- and easy chairs with middle-aged able-bodied users as participants[12]. From the experiments, the industrial designer identified important key sentences for the design of a new chair, considering both functional and emotional requirements.

### Scanning of body dimensions for the design of chairs and workplaces

In order to meet functional requirements of users with well-designed products, it is important to gather sufficient knowledge about the human body and its dimensions. Data in most national and international anthropometric databases have lost their actuality. Swedish body sizes have changed due to changes in life conditions and life- styles and today’s cultural diversity means that a larger variety of persons are represented in our population. Laser scanning technology means that it is possible to register body dimensions as well as body shape in a very efficient way. Industrial Design and Ergonomics at LTH have recieved a considerable research grant from AFA Försäkring, a Swedish insurance organisation, to build up a new and statistically representative ergonomic database of Swedish adults, in connection with the Swedish Proforma project. Results of our project have the Swedish car and furniture industry as major target groups. Results of the AFA project will be implemented in several Department projects.

1/ Eason K D, 1994. User-centred design: For users or by users? In: S McFadden, L Innes and M Hill (Eds), Proceedings of the 12th Triennial Congress of the International Ergonomics Association, Human Factors Association of Canada, Ontario, 1994, vol.1 pp 78-80 2/ Dahlman S, 1986. User requirements. A resource for development of technical products. Doctoral thesis, Department of Consumer Technology, Chalmers University of Technology, Göteborg, Sweden 3/ Jordan P, 1999. Designing pleasurable products: An introduction to the new Human factors. Taylor & Francis, London 4/ Karlsson MA, 1996. User requirements elicitation: A framework for the study of the relation between user and artefact. Doctoral thesis, Department of Consumer Technology, Chalmers University of Technology, Göteborg, Sweden 5/ Lawson B, 1997. How designers think. The design process demystified. A completely revised third edition. Architectural Press, Oxford. Hasdogan G 1996. The role of user models in product design for assessment of user needs. Design Studies 17:19.33 6/ Christoforidou D, 2004. Interviews with practicing industrial designers about communication with users in their design work (Intervjuer med industridesigner om kommunikation med brukare i designarbetet). Preliminary report in Swedish. Division of industridesign, LTH, Lund University 8/ Sperling L, Christoforidou D; Olander E, 2005. Communication with users in industrial design activities. Educational report, Division of Industrial Design, LTH, Lund University 9/ Russell JA 1980. A circumplex model of affect. Journal of Personality and Social Psychology, 39, 1161-1178 10/ Sperling L, Eriksson P, 2006. Exploring drivers’ experiences of material qualities in present and future interiors of cars and trucks. In: Proceedings of The Ergonomics Society Annual Conference April 2006, Robinson College, Cambridge, UK 11/ 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 12/ Sperling L, Kristav P, Olander E, Lekeberg H and J Eriksson J, 2006. Exploring emotions for design of your future chair. In: Proceedings of the International scientific conference “Design & Emotion” September 2006. Chalmers University of Technology, Göteborg, Sweden

## Design Management

Lisbeth Svengren Holm

Industrial designers work – most likely – in a management world. They may be managers themselves, leading a company of their own, having people employed; or they may be employed in a design consultancy or in a company, probably a manufacturing company. In the course of their work, industrial designers will face and cope with the power of managers, the dilemmas of managers, the decisions made by managers. During the professional life of an industrial designer managers play an important part, creating the context and the conditions for the design work and its outcome. Industrial designers are rarely experts on management, but needs to know enough about management and its logic to understand how it affects their own work. Design management is only one aspect of management but the one that is closest to the design process. Design management is about management of the design process, about how to deal with designers, but also how to value and evaluate design. Design management is a subject to learn about the integration of design and management in an industrial context.

Design management is a small research field on the boarder between design and business management. It is a meeting of two worlds – a meeting that can be very complicated, despite the mutual dependency. Design management is the knowledge about this meeting, the conditions for it, problems, opportunities and the value of it. As an academic field it is very new but as a practice it is as old as the industrial development. The purpose of research in design management has been to understand and develop some models for the role of design and designers in a corporate context with a focus on the business enterprise. In this article we will give an overview of design management as a subject, its development over time, and its relation to the development of management.

### Design management in a historical perspective – the classics

Design management – to manage, to lead design processes – has the same roots as industrialisation as such in the mid 18th century. When production was split into separate activities and phases in these early days of industrial firms, the design of the product became an activity of its own, an activity of planning and sketching before manufacturing. This created a need for a new profession: the designer – or modeller as it was called[1]. Forty tells the story of how the pottery maker Josiah Wedgwood started to commission artists for new designs; he regarded them as very troublesome people to work with and that they needed special guidance[2]. This could be viewed upon as the first practice of "design management". As a conscious activity and a field for study we have to go to the 1970s to find any written material[3].

Industrial designers emerged as a profession in the early 20th century and some European companies started to have a regular collaboration with designers in what we now would refer to as a strategic alliance; the most notable examples are AEG in Germany and Olivetti in Italy. Inspired by Olivetti, Thomas Watson Jr, head of IBM, started a collaboration with the architect and designer Eliot Noyes in the mid1950s. This contributed to the success of IBM in the 1960s. Watson's statement that "Good design is good business"[4] has often been referred to as a raison d'être for design management. Common for all these examples is that the designers were not employed. They continued to run their own design firms and had other customers, but were still responsible for the design of these companies. This, of course required that the top management legitimised the position of these designers. The designers were then able to stay out of internal politics and besides that they also wanted to have other customers for inspiration and their own development. A more recent example of this kind of design management is Bang Olufsen, where David Lewis is their design manager without being employed but with a veto for the design decisions.

Research and theories of this kind of relationship is, within management, fairly unnoticed. Design historian Stephen Bayley[5] states – a little bit ironically – that these classical examples of design management are stories about a few "enlightened" top managers. Despite the fact that they were leaders in their industry they did not have any followers in this respect and one can also state that these leaders had a personal interest in design. The logic for business success has been dominated by technology, economy and marketing. Compared to these fields, design has had very few representatives in business management. The classical examples are also from a time when large corporations had a centralised management and strategies were planned and implemented top-down. In the decentralised organisations that emerged in the late 1970s, management and implementation of strategic decisions are much more complex. Flexibility and listening to the market became important and a dominant logic for the development of strategic management.

### Design and strategic management

What contributes to profitability follows, according to Richard Normann[6], a strategic management consultant and researcher, certain logics for each industry. This is further supported by benchmarking, a popular concept for management, where companies compare themselves with the best in class. Development of management models could be seen as a "follow-John" pattern and some management models are popular for a time-like fashion.

Global competition, diffusion of technical know-how, the increased level and equalisation of quality in global production have turned design into a strategic element for sticking out in a crowded market. This is further supported by the change of consumption from a materialistic to a symbolic one, where brands are the symbols for the desired life styles and design is the medium for its communication.

Despite the argument for design as a logical tool for competitiveness, very few companies have been capable of dealing with design. To prove the value of design has therefore been a common activity for design management research. Studies of the result of investment in design have shown positive effects[7] but also that there is no straightforward relation. Researchers seem to agree that good design in combination with a capability to integrate and organise the design function in the company's strategic development can support a positive development of the company's competitiveness[8].

With a strategic perspective of design, design management has to deal with the relation between design and a company's business idea, its mission and vision. Development of the company's business idea, what product it offers, to whom and with what resources, i.e. how it makes money follows, according to Normann[9], two different courses of events: product variation and re-orientation. Product variation, improvements or model changes can take place within the existing organisation, resources and competences. They take place on a regular basis. Re-orientation, a more fundamental change of the business idea, requires more fundamental changes in the company. It relates to the strategies of the company and to political processes as dominating ideas and significant actors will be affected[10]. The change from serving an industrial market to serving a consumer market, like for instance Ericsson did when they launched mobile phones, is an example of such a re-orientation. What Normann did not notice – as he does not have a design management perspective – is that also the smaller product variation projects could/should include industrial designers and when this is not business as usual, it will require a new thinking as well. What many designers do realise is that they should not stick to small innovations but work on the more radical ones. A consequence of this is that they have to climb the corporate ladder that has many slippery steps.

Wally Olins[11] defined corporate identity as "visualization of the business strategies". At the same time, the design visualises the priorities of the company, its competence and philosophy. Design and strategic management is hence both about what a company communicates and what it produces. In this sense the industrial designers could have an important role in integrating both perspectives. They do, however, need to understand the strategic thinking of their client companies as well as to become strategic partners.

1/ This development is described among others by Gustaf Rosell (1991) in "Anteckningar..." och Adrian Forty (1986) Objects of Desire. Design and Society 1750-1980. London 2/ Forty (1986) 3/ See for instance: Pilditch, James. 1970; Schutte, 1975 The Art of Design Management; Olins, Wally, 1978. Corporate Personality 4/ Watson, 1975. Good Design is Good Business. In Schutte 5/ Stephen Bailey. 1979 6/ Normann, R. 2001 7/ Potter el al. 1991; Hertenstein et al. 2001; Johansson, 2006 8/ Svengren, 1995; Cooper & Press, 1997; Jevnaker, 1998, Borja de Mozota, 2003 9/ Normann, 2001 10/ Normann, 2001 11/ Olins, Wally, 1989. Corporate Identity. How to...

## The response from design firms as strategic partners

Lisbeth Svengren Holm

The research project that we as design management researchers at the Department of Design Sciences, Industrial Design Division, have worked on since spring 2006 has had the purpose to get more knowledge about the development of the industrial design firms from a management perspective. In today's global business climate, design has become recognised as one of the most important tools for the creation of competitiveness and for sticking out on the marketplace. Have the design firms managed to match this development? Do the design schools teach the right design competences?

The number of designers educated at university level has increased in the last decade. There are more design schools and there are more design programmes at technical universities. Also business schools teach design both from a communication and an innovation perspective. This is not only the case in Sweden but in Europe, the US and Asia as well. It is not self evident that all those who have an education as industrial designers will work as designers, but they certainly constitute a large resource. As this article focuses on design management we will leave the design part and conclude that many design schools have introduced design management courses, at least shorter ones. These courses give an orientation about the relationship between design and management but can not turn designers into accomplished managers. Many of them are not even interested.

Industrial designers who are going to work with industry however, have to understand design management both for their own company, in case they want to run a firm of their own, or if they are employed – either by a manufacturing company or a design consultancy firm. Compared to the situation in the late 1980s when David Walker wrote his article "Two Tribes at War" (Walker, 1990) the understanding and interest from designers to deal with management issues is quite different. Also, many manufacturing companies have learnt to collaborate with designers and in many companies, like for instance Sony Ericsson, Electrolux, IKEA, etc, the designers have more of a strategic position.

There have been few studies of design management within a design firm. Design management research has focused on the corporate context. The design consultancy is often very small. In a country like Sweden there is less than a handful of industrial design consultancies with more than 20 people employed. We do not count the engineering consultancies. Most industrial design based consultancies are still fewer than five people. Management within these companies is rather uncomplicated. The recognition of design as a competitive tool within many manufacturing companies has been the basis for the growth of the design consultancies. This recognition has also turned design into a strategic resource with a demand on the design consultancy to be capable of understanding strategic thinking. We therefore believe that the trend is towards larger design consultancies based on industrial design but with a planned growth that will require not only design competencies.

The industrial design industry has grown in the last couple of years, both in turn over and number of employees. In Sweden the three largest industrial design companies have almost doubled the number of employees. However, they do not only grow with industrial designers, but have employed graphic designers, engineers, interaction designers, and people with a business education background. These design firms work internationally and have started to set up offices abroad. Companies like IDEO and Design Continuum have grown into large international companies with subsidiaries in several countries, in the US, in Europe and in Asia. These companies have also employed these kinds of people but, to a greater extent, compared to the Swedish examples, also human factors people, i. e with a background in psychology or sociology.

When, in spring 2006, we started our research project about "the development of the design firm", we had a hypothesis that industrial designers have more collaboration with marketing people and top management than they used to have and we were curious how these encounters are handled and dealt with. Another hypothesis was that despite the similarities that exist between marketing and industrial design, they still have differences – and maybe difficulties – to collaborate. Industrial designers and marketers have similar objectives but different backgrounds and tools to work and communicate with. Based on earlier research[1] and recent experience from student projects where marketing, engineering and industrial design students worked together, a lot of misunderstandings and disputes were reported.

Traditionally, marketing people work with graphic designers who are part of an advertising firm. In manufacturing companies , marketing is responsible for packaging design, but also this field of design is often limited to graphic design. Industrial designers have traditionally worked with engineers, who in turn do not always integrate with marketing within their own company. The gap between marketing and technology in companies is well researched. Despite the long emphasis on cross disciplinary team work in management, many companies are still quite fragmented.

We have so far – November 2006 – interviewed one international and six Swedish industrial design firms. We have had access to interviews with three Finnish industrial design firms. We have done interviews at one client's firm that has worked with these industrial design firms and we are going to interview more client firms. The results so far are therefore very preliminary. Some focus on the integrating role of the designer concerning the product and the brand and the technology and marketing disciplines.

### The designer as integrator of product and brand

The analysis of the design interviews shows that there is a great awareness of the importance of design and the need for more of a strategic thinking. The strategic thinking is focused on the integration between the product and the brand.

### The designer as integrator of engineers and marketers

The product development department is still the most common initiator of the design project, but the marketing department has started to take initiatives. The industrial designers do work in the projects with the engineers but they also try to engage the marketing department in case it was not involved from the beginning. The briefing process and the workshop as a tool for developing an understanding of the project has been a good platform for inviting people from different departments in the company to participate. The role of the designer could therefore be considered as an integrator of engineers and marketers as well.

1/ Svengren, 1995; Svengren Holm & Johansson, 2005

## Design Following Ethos in the Global Waltz - a Hollywood Ending (thesis working title)

Despina Christoforidou

Fact: Our actual patterns of consumption are not compatible with a sustainable way of living. Concerns regarding global warming, pollution, decrease of natural resources etc, have lately raised a lot of attention. The rhetoric employed to heighten public awareness on sustainability have always been fatalism, or playing with feelings of guilt and shame. Thus, eco-matters are perceived as a must, a constraint, and are not coupled to anything positive.

These mindsets are all but compatible with those of the customers while purchasing a product, which are coupled to necessity, functionality, usability and pleasure. Moreover, environmental issues are global and are related to the future of mankind and the Earth. The purchase of a product is local and deals with the present or near future of a particular individual.

Fact: Design has customarily been associated with products, consumption and consumers. Design is one of the key factors at the purchase moment, is the consumer going to be attracted by the product or not? Design entails a rather high glam factor.

Question: Could design be put in the service of sustainable society by making the ecological matters appealing to the public in general and the consumers in particular?

Question: Is it possible to tackle ethical and ecological issues from a positive and glamorous perspective and thus contribute to make the idea of design following ethos natural and inspirational for the design community?

Design could become a decisive factor and designers key players in the process of finding the right pathways. The discipline design certainly has the potential. It is visionary, creative and pragmatic to mention a few of its qualities, and it can help set the frame for a new sustainable and yet pleasurable culture and enable a happy ending in the best Hollywood tradition. Through my research I intend to find out whether and how this will be feasible.



## Diversity among users and how to involve users with disabilities in the design process

Elin Olander, Designer MSD, PhD student in Industrial Design

My thesis project is about the user and how to involve the user in the design process. The user and the industrial designer are both experts in their own areas. The user's expertise is about how to handle products in different situations and contexts. The industrial designer's is to transform the user's requirements with other stakeholders' requirements into a physical object or a service. From my point of view, it is important to respect the expertise of both, but where to draw the line? To which extent should the user be involved in the process and in which phases? Which methods can the designer use to make users enthusiastic to express their opinion about products? The degree of involvement of users differs between designers, projects and phases in the design process; from those designers who let the users actually design an object themselves to just letting the users answerer questions in a questionnaire or even neglect to interact with them at all. Designers are trained to consider the users when designing but some users are usually more difficult to reach such as children, persons with disabilities and users in extreme work situations such as a space station or submarines.

My research focus is to develop methods for involving the user in the design process. My thesis project is partly financed by the Vårdal Institute, and I belong to their healthcare research school, and my specific commission regards research concerning young persons with disabilities. My specific interest is how to involve this target group in the design process which gives me my theoretical framework of *universal design*. Universal design is defined as an approach to design that incorporates products as well as building features which, to the greatest extent possible, can be used by everyone[1]. This doesen't mean "one size fits all" or that it is a synonym for assistive design. Theories about universal design emerged from the United States during the middle of the 80s, the founder is Ronald Mace. A universal design product needs no explicit marketing for a specific user group. A "true" universal design product includes, for example, persons who are blind without screaming it out loudly. Parallel to universal design there exist different terms of a collective concept with the philosophy of giving the diversity among users an important role in the design process. Universal design, *inclusive design* and *design for all*, are the three most common definitions today. These terms are sometimes used as synonyms and the distinction between them is not obvious.

Products designed with a universal design approach should be usable by people with the widest possible range of functional capabilities. Universal design is often incorrectly thought of as design for people with specific disabilities, however universal design includes products that are directly usable (without requiring assistive technologies) for a wide range of users and those products that are made compatible by assistive technologies[2]. For designers working with universal design it is important not to distinguish between disabled and "abled" people or others diverging from the norm[3]. The word "universal" may contribute to a misunderstanding of the concept since it can imply to seek "universal solutions" to problems and meet the needs of all people[4]. Some argue that the term *inclusive* design better illustrates the concept. Inclusive design encourages an attitude of: "What if we design like this, then we would include these user groups as well, rather than exclude them"[5].

1/ Preiser W, Ostroff E (2001). Universal Design Handbook. McGraw-Hill, New York 2/ ENGAGE (2005), Report of the state of the art, ENGAGE project, Designing for Emotion, Access: 2005-09-01 www.emotional-design.org 3/ Hansson, L. 2006. Universal design – a marketable or utopian concept? Doctoral thesis, Center of Consumer Science, Göteborg University, Sweden 4/ Steinfeid, E. and Tauke, B., 2002, "Universal Designing", Universal design 17 ways of thinking and teaching, Ed J Christophersen, Oslo: Husbanken 5/ Högberg D (2005). Ergonomics

In order to make it easier to create products with a universal design approach, Mace and his colleagues constructed and established seven guidelines which nowadays are globally used[6]. A product can not fulfill all seven but as many as possible should be considered in the design or redesign of a product. These seven principles guide the designer to pay attention to mainly functional product qualities such as equitable to use, flexibility in use, intuitive to use, tolerant for error, low physical effort. The attempt with my thesis project is to integrate the user's emotional experiences in the theoretical framework of universal design: emotional experiences such as identity, personal branding, elicited feelings, attachment, meaningfulness and attractiveness. To realise this integration, I try different approaches to involve young adults with disabilities in the design process. I try out and develop different mediating methods resulting in tools for the designer to be used together with the user. I have planned a case study with different design projects in order to elaborate and apply both methods and theories. Some of these design projects approach problems identified in an interview study I have done with the target group. The design projects can go in two different directions: from an assistive product or an assistive function within an ordinary product which may be transformed to an everyday product for everybody – for example crutches for persons with walking problems are today sometimes replaced by the user with Nordic walking poles used for sport activities. The other direction is the opposite – a transformation from an everyday product not accessible for everybody to an "assistive product" with a universal design approach not marking a specific "extra user": for example, if an ordinary DVD player were equipped with speech synthesis, the use of manuals and extra assistive products would be less necessary for everybody with reading, sight and information problems.

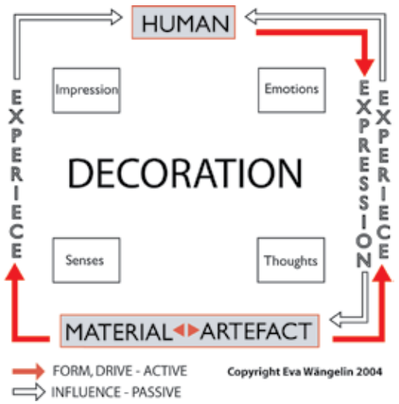
Integrations and User Diversity in Product design. PhD thesis. Loughborough University 6/ Story, M., Mace, R., Mueller, J. 1998. "The Universal Design File, Designing for people of all ages and abilities." The Center for Universal Design, North Carolina State University, Raleigh, NC, USA.



## Decoration as a way of transforming impressions and how to express them as representations of reality

Eva Wängelin

The origin and outcome of a design process can be described as a transformation of an impression to an expression. My research area is decoration as a form of expression. Decoration is a term that means "that which has been decorated". In this way it relates both to something situated – the décor – and to an activity[1]. My focus is to understand the act rather than explaining the event (place + act). The difference is that the subject – i.e. the designer – is more present in the act, than in the event The aim is to create a basis for understanding how decoration can be used for communicating design transformations.



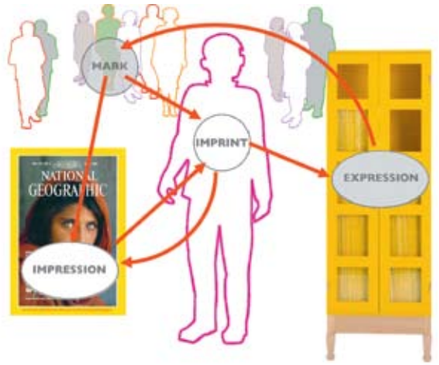

Decoration is placed between man material and artefact. Decoration is embellishment placed onto a surface. The surface possible to decorate, being most close to the human – both physically and emotionally – is the body. Since the human became domiciled, decoration moved away from the body, first on to clothes and then the things we own – the objects around us and our physical environment. The main function of decoration has traditionally been to make something – an object, an individual or an environment – more attractive or valuable. This function of the decoration is very much related to the circumstances of experience and use.

But there are also other ways of looking at decorations. Why do humans decorate their environment? What do we communicate through decoration? Adolf Loos declared that, "Lack of ornament is a sign of spiritual power"[2]. William Morris thought differently. He believed that decorating was something that the humans did in order to add joy to production work, which otherwise would be intolerable[3]. So, decoration can be seen both as an expression and something you experience. Decoration has from time to time needed excuses, reasons for its presence. But one hypothesis does not exclude all others. That would be like saying that we speak just because silence is boring, and not take notice of the content of what we are saying. There is to my knowledge no contradiction between the fact that we speak to avoid silence and that we want to communicate something with our words. The same is true for decoration. We do not assume that body decorations in tribal societies are only made for aesthetic needs.We know that they mean something, that they have a purpose[4].

When one looks at decoration in relation to objects there are two elements to consider: the function of the object and the function or meaning of the decoration. This relation or contradiction between the function of an object and the decorations placed upon it is more present in some objects than others. Decoration that relates to function can have the form of information more than decoration. This interplay between the need and the needless is less present in printed textiles. Of course textiles do have functions, but the functions are less predetermined. The main function of textiles can be to be the carriers of decoration. That is why textiles could be a suitable "surface" to analyse.

Decoration can be seen as the designers' way of expressing representations of a reality. Decorations represent the reality in different "levels" and with different purposes, for example: to copy, imitate, illustrate, interpret, abstract and so on. In order to

1/ -tion is a suffix that is used to create a noun from a verbal stem. Example; construction from construct; situation from situate, agitation from agitate and so on. 2/ Loos A. Ornament och brott, fyra texter om arkitektur; 1985, p. 21 (the quotation is translated by me) 3/ Weimarck T. Design och Konst – texter om gränser och överskridanden I; 2003, p. 90 4/ Brain R. The Decorated body 1979; p.185 5/ Asplund J. Hur låter åskan; 2004, pp. 37-38 6/ Claude Lévi- Strauss used the term bricolage in his book The Savage Mind, as a term for pre-scientific science 7/ design




achieve the levels of representations one uses tools or means. I try to establish, whether some conceptual tools are necessary for a specific purpose while others are optional. To describe and verbalise the process between the designer, his internal memories and aims, external values and demands, and the relation between the impression and the final expression is part of understanding the act.

Will design be better with proper decoration? In a global society, it becomes more and more important that designers can transform their own cultural heritage in a way that can attract and evoke emotions outside of their own product sphere. What happens in a world where the cultural limits of decorative elements vanish, but the understanding of the communicative aspects is less easy to comprehend or transfer? By understanding and integrating knowledge of communicative qualities in product design, and making considerations about that in the design process, we can become better designers.

Industrial design can have a strong technical touch, but in order to perform optimised design work, it is also necessary to make use of thoughts and emotions that are related to inner experiences and private associations of the individual. This is perhaps also true for design research. How do you combine research and practice in a way that serves both the research community and your own identity as an industrial designer? For me it is vital to try to make room for some practical design work in the research process, hoping that this work may be a part of the creation of a research tradition within the field.

Johan Asplund writes that a scientific process can be described as starting with insight, which you gain through observing something through your senses, and then making a metaphor and finally an experiment; some sort of laboratory work in order to create comprehension[5]. Transferred into a plan of how to study decoration, I have formulated three research questions that each provides a step towards realising my doctoral thesis.

1. Insight – How can I see, interpret and describe decoration?
2. Metaphor – How can I experience, understand and evaluate decoration?
3. Experiment – How can I create, express and use decoration?

The plan provides me with the possibility to perform as a designer in experiments, and I am certain that this will enrich my research. Panagiotis Louridas has described how design can be compared to bricolage[6].

Self-conscious design[7] is, then, a kind of metaphorical bricolage. This is in accordance with the view of design as a reflective conversation with the situation at hand. In this view, design is a discussion conducted with the materials in the medium with which the designer works. It is a hermeneutic process, a process of iterative understanding[8]. The designer proceeds by interpreting the effects his actions have on the situation. He tries to understand the effect of his materials and of his tools, to define their place in a structure. He wants to create a structure out of his means and the results of his actions[9].

Louridas points out that the interdependence of contingent events is highly important. He claims that without contingency there can be no design, but only manufacture. The description can also suit design research. To add design practice to the research is to expose oneself to contingencies and makes room for the possibility to make a structure out of events.

as profession 8/ Coyne, R. and Adrian, S. 'Is Design Mysterious?' Design Studies Vol. 12 No 3; 1991 is referred to in the quotation 9/ Louridas, Panagiotis 'Design as Bricolage', Design Studies vol. 20; issue 6, 1999
Note: National Geographic Cabinet by Mats Theselius



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