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Experience of Furniture in Homes

Creating Conditions for Design with Consideration to
People in the Third Age

Oskar Jonsson



Division of Industrial Design - Department of Design Science



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Licentiate Thesis

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Abstract

This licentiate thesis in industrial design concerns the challenge and opportunity to meet the demographic changes and the future senior market. The aim is to explore how various user-centered design methods can be combined, modified and practiced to create conditions for the design of totally new or improved products. Design is understood as a process to develop solutions with the starting point in users' needs. A user-centered design process, instead of a technology and market driven one, is believed to lead to products that are more desirable, useful, in line with users' needs and contribute to long-term use. The product category in focus is furniture and other interior products and the context of use is the home.

Two studies were carried out, one with focus group interviews about changes when moving to and living in a newly built apartment particularly developed to fit the needs of seniors and one with situated interviews in homes. Both had the intention to identify various end-user needs. In total, 26 people aged 53-93 participated in the two studies. The focus group interviews emphasized views and attitudes towards, changes needs and aspirations. The situated interviews offered deeper insights and understanding of the interplay between user, products and the context where the products were used. The findings demonstrate that products perceived as comfortable, flexible and pleasurable lead to attachment and desirable emotional experiences such as dignity, meaningfulness and freedom. The findings about needs that the end-users themselves express differ from the existing recommendations for the design of furniture and other interior products for old people. The latter are mainly based on individual physiological changes that aging may bring. New findings point to demands on products that also support the psychological and social changes, and that correspond to an identity of an active, independent and self-determinant individual. The thesis concludes that designers may benefit from being closely involved in the creation of end-user knowledge to ensure that the findings are adequate for the present challenges' specific needs and that the findings embrace a holistic perspective

on humans' needs. A future recommendation is to respond to the findings of the studies with design solutions as physical representations, and to involve users in iterative design processes.

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Årsta, September 2011, Oskar Jonsson

Appended Papers

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals. The papers are appended at the end of the thesis.

Paper 1: Jonsson, O., Sperling, L., Östlund, B. & Dalholm Hornyánsky, E. 2011. Furniture Design beyond Usability. Submitted for publication in Journal of FORMakademisk. Special issue: Articles from the 9th NORDCODE Seminar.

Lena Sperling, Britt Östlund and Elisabeth Dalholm Hornyánsky and I jointly planned the study on which this paper is based. I independently carried out and analyzed the study. Lena Sperling and Britt Östlund contributed with critical review of the text.

Paper 2: Jonsson, O., Sperling, L. 2010. Wishes for Furniture Design among Persons in the Third Age. In: Proceedings of the 7th International Conference on Design & Emotion in Chicago.

Lena Sperling and I jointly planned the study on which this paper is based. I independently carried out and analyzed the study. Lena Sperling contributed with critical review of the text.

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1 Introduction

This licentiate thesis in industrial design concerns user-centered design in early phases of the design process. Design is understood as a process to develop solutions starting from users' needs. The focus is on the interplay in between users, products and the context where the products are used. This interplay constitutes the base/starting point for the design. The concept of needs is used broadly and the ambition is to capture a holistic perspective. The title, *Experiences of Furniture in Homes*, summarizes the emphasis on an end-user perspective with individual's feelings and thoughts, furniture as the product category and homes as the context of use. The subtitle, *Creating Conditions for Design with Consideration to People in the Third Age*, summarizes the emphasis on early phases of the design process and people in the third age as users. The third age is an ageless and tentative concept articulated by Peter Laslett (1991) in order to capture new lifestyles among old people. The concept is used in this thesis as a means to avoid thinking of biological age as a cohesive factor and an out-of-date image of old people and their stereotypical products. Viewing old people as a homogeneous group with similar interests, common attitudes and ways of living contributes to age discrimination. Such a preconceived and uniform understanding has become increasingly erroneous (Eriksson, 2010).

A well-known conclusion drawn from demographic studies is that the proportion of old people in industrial countries is growing. Between 2005 and 2050, in the more developed regions, the population aged 60 or over is expected to nearly double (United Nations, 2007). Society and individuals would benefit from old people living in desirable and accessible living environments, houses and interiors that are perceived as safe and comfortable. Furniture and other interior products may promote and motivate mobility, health and wellbeing. Pieces of furniture that are desirable to own and usable throughout a user's lifetime, for those who may inherit and for second-hand users, also influence the high replacement frequency of today, which is in conflict with the goal of achieving a sustainable society.

A barrier for meeting old people's demands for active and independent living is that aging and age-related labels evoke predominantly negative associations (Weijters & Geuens, 2006). There are stereotypic attitudes about old people, and old people do

not always perceive themselves as belonging to a given age group. This along with the complexity of defining the group has led to reluctance on the part of various actors in the innovation system to approach old peoples' demands. It has also resulted in insufficient knowledge of their demands and a limited range of furniture that fits active and independent users in the third age.

This research takes its starting point in the challenge and opportunity to meet the demographic changes and the rapidly growing senior market. Sweden is facing a number of social challenges that will have a strong impact on economic performance; one of these is an aging population (Vinnova, 2011). The *PLUS-products* project was conducted from 2008 to 2010. The aim was to explore how the furniture market could be opened to new segments of older consumers. Vinnova, the Swedish Governmental Agency for Innovation Systems, states in its report, *Born to be Wild*, that the majority of the 55+ population are not in need of any markedly specialized products, but rather products that are somewhat adjusted, without standing out as being characteristic of the 55+ consumers (Vinnova, 2008). This research strives not only to influence adjustments of products to the targeted users, but also to influence thinking in totally new or improved approaches and solutions for creating innovations that are usable and desirable for all users and thus contribute for long-term use. The Swedish furniture industry has a great shortage in efficiencies along the whole chain of processing, from raw material to refined product. This is caused, in particular, by the loss of integration between actors in the innovation system (Bregge, Johansson & Pihlqvist, 2004). A link in the chain of processing that this research aims to reinforce is the existing lack of communication between the furniture industry and its old age customers. This has led to insufficient knowledge about users' needs. A central task in the *PLUS-project* was to bridge this gap, with end-user involvement as a driving force for innovation and a resource in the design process.

1.1 The PLUS-project

The *PLUS-project (Development of the Swedish Wood and Furniture Industry for Consumer Oriented and Competitive PLUS-products)* was a resource that made this research possible. The overall aim of the project was to ensure future competitiveness and development of SMEs in the Swedish furniture industry by a more coherent and user-centered innovation process. *PLUS-products* is a conceptual category of products that are designed for a wide range of diverse potential users and are desirable and usable during as long a period of one's life as possible. One of the ideas behind the project was actually raised by a furniture retailer who observed that he met a new

group of consumers for whom he did not have an appropriate selection of furniture. An assumption was that people in the third age cannot find the furniture that they are looking for. The collaborating companies were considered to have a common need to develop their home markets and be prepared to achieve better success on the future consumer market. The aim of the *PLUS-project* is in line with thoughts of the concept *inclusive design*, which constitutes a strategic framework and associated processes by which business decision-makers and design practitioners can understand and respond to the needs of diverse groups of users (Coleman, 1999). Collaboration partners in the *PLUS-project* were researchers at the Department of Design Sciences at Lund University, researchers at the Department for Management and Engineering at Linköping University, seven Swedish furniture companies, the Swedish Federation of Wood and Furniture Industry (TMF), and end-users: today's and tomorrow's people in the third age.

The companies were:

- Lammhults Möbel AB
- Swedese AB
- Nelo AB
- Allinwood AB
- Stolab
- NC Nordic care
- OH Sjögren AB

The specific aim of research at Lund University was to provide a grounded base for the design of useful furniture and other interior products that will be desirable for a wide range of users and will contribute to long-term use.

1.2 Aim and benefits

This thesis presents research that explores how various user-centered design methods can be combined, modified and practiced to create conditions for the design of totally new or improved products. The goal of the research was to create new knowledge about and by means of user communication. The motivation for doing this was the need to transfer knowledge about users and user experience to complex innovation systems. The reason is that there is a lack of sufficient knowledge in the system of product development in the furniture industry for meeting end-user needs (Brege, Johansson & Pihlqvist, 2004). The design research presented focuses on early phases of the design process. It starts with user's needs, goes on to identify problems and

wishes, and in so doing creates conditions for design.

The two papers included provide better insight into the emergent needs of people in the third age, needs that are relevant for the design of home furniture and other interior products. The results generated insights translated into and articulated as end-user values that in this thesis are what the end-users are striving for. Thinking and expressing goals in terms of end-user values can facilitate the dialogue, enhance the interaction between actors and improve the act of prioritizing for well-balanced decision making throughout the entire design processes.

The dominant approach in this field is one of doing thing *for* old people instead of exploring ways of doing things *with* them. By involving people in the third age, this research has striven to generate insights and empathy that may be used in design, and to avoid negative stereotypes and lack of knowledge that can lead to product failures. In addition, this approach strives to understand people holistically, from how they use products to the role products play in their lives, and indicate needs that are prioritized by people in the third age. This challenge the negative stereotypes associated with aging and older people. It tries to change perceptions of them, both as general attitudes in society and as ways and means, and not to exclude them from the expert discourse in the design process.

1.3 Research questions

Based on the aim of the studies, the following research questions are addressed:

- How do people in the third age interact with and perceive their furniture and other interior products? What are their needs, wishes and aspirations?
- How can different user-centered methods be used to create knowledge about the relations between users and products? What knowledge is created?

1.4 Delimitations

This thesis does not claim to offer a description for the practice of industrial design of senior markets broken down into home furniture in Sweden. Only the central and vital primary end-user perspective is considered; there are other important user perspectives to consider in the design process such as retailers, purchase decision

makers and interior designers that prescribe furniture for public and/or private environments. Nor have the companies' categories and visions and their important needs linked to the design of furniture been considered. Klaus Krippendorff (2006) calls this a stakeholder network and discourages talk about THE user as he or she is rarely the only one that counts. With respect to this necessary and fruitful complexity, this thesis focuses on the aspects of the product that relate to the interplay between users, products and the context in which the products are used. The important aspect – what the users are willing to pay for – is not considered in this thesis. The designer's core competences in user-centered design is understood to be both as a facilitator helping the end-user to establish what is in his or her interests, and as an expert who represents the end-user in the design process.

Participants were recruited to the studies that are or will be characteristic representatives of the growing population of people in the third age, who are expected to have increased purchasing power and increased demands on products of various aspects. In total, 26 persons aged 53-93 participated in the studies. The studies were carried out in urban surroundings in Sweden. Sweden has a long tradition of developing products that are attractive on the international market. The Swedish market has been characterized as a good test market for new products and citizens tend to be early adopters (Vinnova, 2008).

1.5 Structure of the thesis

The thesis begins with definitions of and the author's positioning in the fields of innovation, design and user-centered design. This is followed by the state of the art of various end-user needs, the concept of people in the third age, the meaning of "home" and existing recommendations on furniture for people in the third age. Then there is a brief presentation of the two included papers, their outcomes and how they are connected. The methods, findings and contributions are discussed. Finally, conclusions and several considerations for advancing future work in this area are briefly presented.

2 Frame of reference

This chapter explains the author's positioning and presents the state of the art in the field of user-centered design of furniture for the home market with consideration to people in the third age.

2.1 Innovation

The term innovation generally refers to the creation of better or more effective products, processes, technologies or ideas that are accepted by markets, governments, and society. The concept of innovation systems stresses that the flows of technology and information among people, enterprises and institutions are key to the innovative process. Innovation and technology development are the result of a complex set of relationships among actors in the system, which includes enterprises, universities and government research institutes (OECD, 1997). The innovation system referred to in here is the furniture industry sector.

What is crucial is the understanding that innovations are generated in the interaction or teamwork among different actors. Teamwork is characterized by mutual learning, and takes place between a company as one party and users, customers, subcontractors, competitors, universities, research institutes or consultants, such as designers, making up the other party. Håkan Edeholt (2006) states that there may be fundamental difficulties in the interactions among the different actors, if they appear to be talking about the same things as problems, solutions, results and innovations but mean totally different things. The different ways in which things are perceived can be a source of misunderstanding between different actors.

It is commonly recognized that design as a corporate activity is part of the innovation process of new product development. According to Edeholt (2006) the designer's "viewpoint" is more focused on the user's experience as perceived when living with or using the product than, for example, the economist's "viewpoint" that is instead focused on commercialization of the product. This does not necessarily mean that the designer's "viewpoint" is more relevant than the economist's. It is just different, or

placed at a different point, so that other aspects are envisioned that also are important in the innovative system of product development. Robert W. Veryzer (2005) shows that the involvement of industrial designers earlier on in the process of product development can help to avoid distortions in research aimed at capturing customer reactions, and can result in design solutions that are more innovative, better thought out, and more complete. This involvement can reduce overall cycle times and costs and can help to improve the chances for marketplace success. Veryzer (2005) concluded that it was still somewhat surprising to find that the role of industrial design role was so limited early on for the discontinuous or radical projects that he studied.

2.2 Design

Design can be understood as a powerful method that influences and encourages rethinking and consideration of humans. Design may therefore have an educational role in society that can contribute cultural, ethical, environmentally sustainable and social values that affect us all.

There are many definitions of design as a professional practice. Design practice is in this thesis understood as an iterative process to develop solutions that start with the user's needs. To develop solutions refers both to identifying needs and solving problems. In its most general form, design can be described as a prescriptive activity aimed at changing something, or in other words of Herbert Simon (1969): "Anybody designs who devises a course of action aimed at changing existing situations into preferred ones." Industrial designers are responsible primarily for the aspects of a product's design that relate to the interaction between the product and the user – enhancing functional benefits, operational and ergonomic considerations, and aesthetics (Cagan & Vogel, 2002; Ulrich & Eppinger, 2004). A major part of the design process ought to be the study of just how the objects being designed are to be used (Norman, 2002). The ideal-typical role of the design profession in the system of product development is that the designer strives to find new solutions from a user's perspective (Edeholt & Ek, 2008). Lavrans Lovlie (2009) state that, "A key element in the practice of product design is to study people and how they use things as starting point for the creative process." The relation of product to users has become a central theme of design discourse, though users still remain little understood by designers (Margolin, 1997).

There are different views of successful innovation strategies and how dependent they

are on a company's category and vision. Roberto Verganti (2008), for example, explains that analysis of what he calls "design-intensive manufacturers" shows that their innovation processes hardly start from a close observation of user needs and requirements. Rather, they follow a strategy called "design-driven innovation." This strategy aims at radically changing the emotional and symbolic content of products (i.e., their meanings and languages) through a deep understanding of broader changes in society, culture, and technology. Rather than being pulled by user requirements, design-driven innovation is pushed by a firm's vision about possible new product meanings and languages that can diffuse in society (Verganti, 2008).

The designer's work is often limited by a series of preconditions and financial, technical, and time-related constraints, imposed by the client and the market. They work in projects with complex and diverse needs. Designers must please their clients, who are often not the end-user (Norman, 2004). There are also other actors such as users, customers, purchasers, architects, interior designer, retailers, subcontractors and competitors. A typical designer talks about users and concentrates on the aspects connected to the use situation (Edeholt, 2006). A typical business person would describe the person as a customer and concentrate on the moment of sale (ibid.). The manufacturer is primarily concerned about the decision makers, its immediate customers, not the eventual users (Norman, 2004).

Design may be described as the act of combining aesthetic, ergonomics, ecology, ethic usability, safety, durability, economics, and manufacturability. John A. Walker (1989) suggests that the unique ability of the designer is to synthesize, and that it is in this context that the qualities of imagination, inspiration, investigation and intuition play their part.

2.2.1 User-centered design

The overall goal for user-centered design is to develop products with the best possible fit between the product and the user. Human-centered designers are committed to designing artifacts for use by others who may experience the same design solutions quite differently (Krippendorff, 2006). The starting point is the user and the resources, limitations, experiences and expectations. There are three main principles in user-centered design: early focus on users and tasks, empirical measurements and iterative processes (Jönsson, 2006). User-centeredness has two possible meanings: theories and findings about human behavior to act for the user or theories and findings that may help the user participate in the design (Eason, 1994). The dominant approach to design in ergonomics is to act on behalf of users. Ergonomics'

preoccupation with design-for-users approaches has led to criticism that they deal only with a sub-set of human issues (ibid.). People are not just work-performing entities; they are creatures of purpose with ambitions, beliefs, emotions, values, satisfactions and dissatisfactions. This has led to a growing interest in a participative approach; design processes in which the end-user themselves can influence the design so that it is compatible with their goals and beliefs, etc (ibid.). If users switch from being subjects to being participants in the design process, the designers' role also changes. From being the expert who represents the interests of the user the designer now becomes the facilitator; helping the user establish what is in his or her interests. The most successful strategy according to Ken Eason (1994) is to mix the two approaches; *for* and *by* users and he concludes that design *for* users is appropriate for product design in supplier organizations, whereas design *by* users is necessary when systems are implemented in user organizations. Eric von Hippel (2005) points at what he calls the information asymmetry between users and manufacturers and one of its consequence: that users tend to develop innovations that are functionally novel, requiring a great deal of user-need information and use-context information for their development. In contrast, manufacturers tend to develop innovations that are improvements on well-known needs and that require a rich understanding of solution information for their development.

2.2.1.1 User involvement in the practice of design

Involvement means here to participate mentally or physically through engagement and action and in ways of thinking how this participation can take place. Designers cannot always be knowledgeable about user needs and aspirations. Design solutions that make life easier, more efficient, more comfortable or more pleasurable rely, to a large extent, on insights in future users of new products. Involving users may, for example, give a more realistic understanding of various needs, questions and values, be a source to inspiration and offer possibilities for innovations. Improved communication with users may decrease and minimize unexpected failures.

Live user involvement in the design process varies according to the extent that the method offers a real user involvement (Hasdogân, 1996). At one extreme, the designer considers himself as the user and acts out the usage process, at the other extreme a real user participates in the design process (Holt, 1989). Donald A. Norman (2004) argues that there is no substitute for interaction with and study of actual users of a proposed design solution. Design practitioners should be able to realize that human beliefs and behavior are complex and that the individual is in a position to discover all the relevant factors (ibid.). Gülay Hasdogân (1996) states that experimenting on the designed product with live users is one of the most essential parts of the design process which cannot be replaced. Human behavior when using a

product is very complicated, and thus there are many aspects of such behavior that cannot be modeled by statistical or computational means (ibid.).

That user involvement is beneficial for the system of product development is today well known and accepted both in design and business literature. However, there are several views on “how users should be involved”, “what methods to use” and “how to analyze and further interpret the material”. With the increased awareness for the necessity to elicit user needs beyond usability, user-centered design methods making it easier for the user to participate together with designers in the design process are becoming more established in the discipline (Bruseberg & McDonagh-Philp, 2002). Types of methodological choices have been discussed by, for example, Pontus Englebrestsson (2004) who, drawing on Matti Kaulio & MariAnne Karlsson (1998), discusses four enabling factors: data collection method, context, mediating object and participants. While user-research methods may be familiar to other disciplines, conventional design training has not, until recently, incorporated such activities (Bruseberg & McDonagh-Philp, 2002). Such methods have not yet had enough impact on the design practice.

There are also other views on the outcome of user involvement, such as Clayton M. Christensen’s (1997) in the book, *The Innovator’s Dilemma*, widely read by managers. Christensen suggests that “*listening carefully to customers*” is among the primary reasons companies are led astray in their decision making concerning the pursuit of new product development opportunities.

2.2.1.2 Users

The term user can mean a wide range of people and implies quite different views. Often the term is used implicitly. The most common description from a design perspective means a person who interacts directly with a product. Human-product interaction can be placed in three categories: (1) instrumental interaction, (2) non-instrumental interaction, and (3) non-physical interaction (Desmet & Hekkert, 2007). Ken Eason (1987) placed users in three categories: (1) *primary users* (i.e. frequent hands-on users), (2) *secondary users* (using the product through a mediator), and *tertiary users* (people who are affected by the product and might influence the purchase). Business theory classifies, among others, between *lead users*, people who are pioneers for products that might become trends later on (von Hippel, 2005) and *end-users*, who finally employ the product. The definition of a lead user innovation is: (1) the need is identified by a user, (2) a solution is developed by the user, and (3) the solution is of interest to the bulk of the market (i.e. other users that are not yet that advanced in their practice) (von Hippel, 1986). Pia Hannukainen & Katja Hölttä-Otto (2006) show through a case study that extraordinary users, disabled persons in

this example, can be seen as lead users. These extraordinary users do experience needs similar to ordinary users and, in addition, the extraordinary users experience, and are able to communicate, needs that the ordinary users do not yet have. Thus, extraordinary users are a valuable resource in customer need identification. The term *generative user* is described in Edeholt's thesis *Design, Innovation and other Paradoxes* (Edeholt, 2004). The term is used for persons who are not necessarily end-users, but users who help the designer generate ideas. To additionally capture the diversity of users, they can be differentiated by the power relation between users and other actors in technological development (Oudshoorn & Pinch, 2005). The term *lay end users* was introduced to highlight some end-users' relative exclusion from expert discourse (Saetnan et al., 2000). *Implicated actors* are "those silent or not present but affected by the action" (Clarke, 1998). By involving people in the third age that are affected by the outcome of the design process increases their autonomy and their influence on technological development. People in the third age of today and tomorrow are in this research primarily seen as generative users because they help the researcher to generate knowledge. In other words, the ambition is that the knowledge created should be useful in the design of products that also take users in other life phases into account. Of course, the perspective on people in the third age is also that they may be potential end-users, in a sense that they potentially will employ and live with the products.

To develop competitive products it is important to have a holistic perspective in the design process and not only to pay attention to the primary users. In this context they may be a person in the third age, but also secondary users such as household members, relatives, voluntary helpers, home caregivers, and tertiary users such as those who prescribe, recommend, sell, assemble, deliver, renovate, inherit, reuse and disassemble the furniture and other interior products and its material.

2.2.2 Environmentally sustainable design

Designers make decisions related to the use of resources, modes of consumption and the lifecycles of products. Environmentally sustainable design aims to ensure that products are produced and provided in a way that reduces the use of non-renewable resources and minimizes environmental impact. One of the common principles of environmentally sustainable design related to its focus on the interaction between the product and the user is creating longer-lasting, better-functioning and reusable products that age in a manner that does not reduce the value of the product. This reduces the impact of product replacements. One aspect is to provide design solution that serves a user at any and every point in his or her life. The main challenge in design for longevity lies in achieving an enduring satisfaction with the product, rather

than meeting momentary desires (van Nes & Cramer, 2005). Influencing product lifetime through product design requires the development of dynamic and flexible products. This means designing for variability and product attachment, and preparing the product for future repair or upgrading (ibid.).

2.2.3 Inclusive design

There are a number of areas or types of design for people with disabilities, for example “accessible design”, “inclusive design”, “universal design”, “transgenerational design” and “design for all”. These areas or types have their distinctive features, but have in common the emphasis on the social aspect of design and – often – on the removal of barriers of access to products, services and infrastructures for persons with disabilities. The aging of the population has put these issues high on the political agenda. Transgenerational design addresses this need by exploring product design that enhances the quality of life for users of all ages (Pirkl, 1994). The research approach presented goes in line with the thoughts of inclusive design with respect to take human diversity as a starting point and the importance of identifying and understanding contradictory needs or aspirations for the design of desirable products.

The concept of inclusive design constitutes a strategic framework and associated processes by which business decision-makers and design practitioners can understand and respond to the needs of diverse groups of users (Coleman, 1999). The ultimate goal is to develop products and services that can meet the needs of the whole population (Paulsson, 2006). Inclusively designed products are meant to be used by everyone. The challenge of inclusive design is, according to Ingrid Rønneberg Næss & Trond Are Øritsland (2005), to move from looking merely at users, products and tasks, towards a more holistic view of how people use products to socially construct their reality. Otherwise, inclusive products risk being irrelevant to most people and stigmatizing to those who need them (ibid.).

2.3 Various end-user needs

End-user needs relate to both usability and needs beyond usability. With increased user expectations of products, a sensible and well-balanced approach to various end-user needs is more important than ever in design for developing successful furniture from the viewpoint of users. Individuals seek more than usability alone (Jordan, 2000). End-users expect their cultural, social and aspirational needs to be satisfied by

the products with which they surround themselves. To meet these diverse needs, designers must actively develop research strategies especially aimed at coming up with design-relevant end-user findings from a holistic perspective on human needs. Patrick W. Jordan (2000) points at the need to understand people holistically, from how people use products to the role products play in their lives. His utilization of the four different types of pleasure that people may seek in products, presented by Lionel Tiger (1992) in the concept of *pleasurable design*, is a way to categorize different types of user benefit: physio-pleasure, psycho-pleasure, socio-pleasure, and ideo-pleasure. Håkan Efrting (1999) defines the concept useworthiness as, “. . . the individual user’s assessment of the extent to which the technology meets the user’s high-priority needs.” The purpose of the concept of useworthiness is to focus on the importance of a product in the user’s life situation, thereby gaining increased knowledge of the needs of the user. Users’ expectations of products usually are at three different levels (Hasdogân, 1996). The first generally starts at a shop window or in a catalogue, where the user is more likely to be called a consumer, whether or not they are the potential user. That perspective of design may or may not include further, second level, factors of design such as usability or functionality of the product. At the third level (only if the user can progress beyond the second), the user’s expectations of the product are based on his/her ongoing experience with the product.

2.3.1 Usability

ISO defines usability as, “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO9241-11, 1998). Often used dimensions to operationalise usability are effectiveness (the degree to which the particular goal can be satisfied), efficiency (the amount of time it takes to satisfy the goal), and ease of use (the amount of effort it takes to satisfy the goal). In this paper, *usability* refers to the relationship between the user and his or her skills and abilities and the properties of the product. Usability, as distinct from functionality, is not seen as a property that a product can possess.

2.3.2 Product experience

In this thesis, product experience refers to all possible affective experiences involved in human-product interaction (Desmet & Hekkert, 2007). Product experiences should, like usability, not be seen as a property of a product; it is a result of the interaction between product and person (*ibid.*). The construct of product experience broadens the discussion of function. It moves us from a focus on the product’s mechanical

operation to the way it fits in to a user's life. Usability can most likely be a source of and can generate product experience; a user experience can most likely influence and co-create the user's satisfaction with the product's usability (Desmet & Hekkert, 2007). Product experiences may need to be articulated and knowledge about how usability and product experiences are linked to one another is needed to support more sensible and well-balanced decision making in the design process. The product does not exist in a vacuum. It becomes meaningful only in a relation to the user in a given living environment for a given time. These aspects are usually not under the designer's control since they typically involve an individual's connections to people, places or events that are important only to that particular individual. Experiences are not merely personal and subjective but crucially related to interacting with something of interest: an artifact, an activity, or a situation involving other people. An experience can be shared with others and thus be boosted or reduced. The individual interpretation of the experience is still subjective. Experiences are always relational; an experience of something always takes place in a context where the social and cultural impact of technologies is co-shaped by historical developments, material environments, and ethical and aesthetic meaning. The central concept of the *social construction of reality* is that persons and groups interacting in a social system form, over time, concepts or mental representations of each other's actions, and that these concepts eventually become habituated into reciprocal roles played by the actors (Berger & Luckmann, 1966). Material conditions or things in a situation may also guide humans to operations, habitual behaviors that are unconscious. Human beings have the ability to experience a world and to act intentionally in it; things do not (Verbeek, 2006). The concept *sticky information* suggest that needs are not always possible to separate from the owner and gives a taste of how closely the user and knowledge of their needs can be related (von Hippel, 2005).

2.3.3 User requirements

The concept of user requirements can be described as "...those requirements which the user has for the artifact in use, and which are manifested by the problems arising in the context and/or articulated as problems, wishes or desires by the user" (Karlsson, 1996). The definition implies that the user requirements are not always articulated verbally by users and if they are, can be so in many different ways (Engelbrektsson, 2004). User requirements can be more or less accessible. They can be divided into the three categories: captured, elicited, and emergent (Karlsson, 1996). Captured requirements are easily accessible since the users are already aware of the problems and have reflected upon them. If the designer simply asks the users what their requirements for a product are, these are the ones she or he will get. Other

requirements are not so easily captured. The user may not be aware of a problem or may have compensated for the deficiencies of the product, which means that the problems are no longer consciously reflected upon and therefore not present in the user's mind (Engelbrektsson, 2004). By probing with questions or/and by using a mediating tool that can be anything from living environments and a real product to a hand drawn sketch, requirements that users take for granted or are not yet aware of can be elicited. The third category of requirements is emergent. These are impossible to articulate before a new solution is tried, but instead emerge during use of a new product and as a consequence of new experience. The three categories of requirements can also be expressed as visible, hidden and latent needs or defined in terms of active, not yet active and latent needs. An issue here is also the fact that we as human beings have access to our conscious thoughts and beliefs, but not to our subconscious ones (Norman, 2002).

2.4 People in the third age

The discussion of how to define old age has been an ongoing discourse along with the rise of interest in aging and the development of the life course concept. However, the basis from which to define old age has changed considerably. A frequent definition of old people are those who have passed the middle age that according to different sources ends at 60, 65 or even 70 years of age. The third age refers to the period when people fully or partially leave the job market, careers and the most demanding family obligations, but still live a life of relative independence of others' help and support (Laslett, 1991). Laslett repeatedly emphasized that the third age is primarily personal in nature: "Let it be repeated that the coming of the Third Age from the individual point of view is a personal, not a public occurrence: it has little to do with calendar age, social age or even biological age, and above all it is a matter of choice" (Laslett, 1991). The third age is, like all other ages, determined by the lived situation, especially social interaction and social participation. From such a position, it is possible to assume that some people never reach the fourth age and live in the third age until life's end. Others may, due to physical disabilities or other social changes, reach the fourth age early in life. The fourth age is a life phase characterized by dependency and decrepitude. Only about 15 percent of Swedish citizens 65 years or older are dependent on home-help services or live in residential care housing (Johansson, 2010). The remaining 85 percent are in the third age. Many citizens in industrialized countries are entering the third age life phase at the same time as the life span is expected to increase. The longer that people are encouraged to remain in this life stage, the better for older people themselves, their families, communities and

society as a whole.

There is a discussion whether the third age applies beyond the baby boom cohort (whose members were born in the same decade) or a given generation. Chris Gilleard and Paul Higgs (2007) have argued that the third age is so strongly associated with the generation of the sixties that it is difficult to see how it could mark a new stage in the sense that Laslett described it in the early 1990s, that is, as a new stage of life related to retirement and individual development (Laslett & Siegel, 1990). The third age has also been criticized as a way of delaying aging problems and just another way of reinforcing the youth ideals of the times (Gilleard & Higgs, 2007). The great majority of retired people in Sweden who are entering the third age are relatively healthy and active and in a secure financial position (Larsson, 2007). Most of the people living in Sweden have approximately one third of adult life left after retirement. Older people are involved in voluntary work and activities, and are responsible for much of the informal input provided outside the organized voluntary sector (*ibid.*). As a generation, is the baby boom cohort contrasted with the mass-consumer culture as its members grew up during the post-war economic boom in the West with the 1960s cultural revolution and a greater range of educational opportunities, higher material standards and the liberalization of family values. This led to a variety of lifestyles and a more development-oriented attitude. Later the baby boom cohort became part of the IT era and have been ascribed characteristics such as high utilization of the Internet and e-health services (Sinden and Wister, 2008; Karisto, 2008). In Sweden, the number of people over 65 with a foreign geographical origin has increased and is now approximately 11% (Vinnova, 2008).

The gerontologist Lars Tornstam (2011) divides aging on the basis of biological, psychological and social changes. Biological changes relate to an individual's physiological function (i.e. the capacity of important organs and systems of organ). Human physiological functions often change with age. This may lead to a sudden change in one's life situation, which is characteristic for people in the fourth age. While not all older people have disabilities, the prevalence of disability or limitations is highest among this demographic group (CEN/CENELEC, 2002). Psychological changes involve a person's ability to adapt to living environments and changes relating to intelligence, memory, learning and personality. Social changes involve a person's contact with others, his/her position in society as a whole, and in various groups. Sandra Torres & Gunhild Hammarström (2007) describe the most threatening experience of aging is not that of physical changes but of the limitations to one's integrity, constraints in one's personal space, infringement in the home and losing one's self determination.

Although people are now living longer and may develop a range of disabilities over their life span, these may no longer be perceived as barriers to enjoying a high quality of life. New questions may become important aside from those concerning physical ailments and social exclusion. These can include existential questions about the meaning of life or how long a meaningful life can be.

2.4.1 Patterns of relocation among people in the third age

The patterns of how people move changes over time and probably between the cohorts of old people. The tendency for old people to move has been low for a long time, but seems now to be increasing among people 55 and older (SOU, 2008). With increased age, there is also a significant tendency to move from detached houses in private ownership, and a less significant tendency to move to central parts of a municipality. This points to a general downsizing for many people in the third age. The increased number of modern and accessible apartments has enabled older people and people with physical disabilities to remain in their homes or be able to find an apartment that meets their individual needs and/or wishes. In Sweden, one is able to obtain governmental subsidies for adapting housing, which further increases the ability to remain in one's home for a longer time or until life's end. Increased safety in homes through qualified efforts from home help services and home medical services has also contributed to it becoming more common that people can and want to remain longer at home. Technological developments have enabled advantageous support for the individual in daily activities, for safety and security and increasing support for care giving. These facts indicate the expectation that more old people will want to, but also have to, live in their homes instead of moving to residential care facilities. Their homes will probably more frequently be the place where care will be given for older people in need. It is also possible that the development of housing alternatives, such as cooperatives for old people, will increase.

2.4.2 The image of old people

Becoming old is not static but to a high degree a dynamic phenomenon. The image of old people today may not be the same as tomorrow. Erik H. Erikson (2004) states that whereas historical, cultural anthropological and religious documents bear witness to the fact that old people in the past were applauded and even revered, old people of today often face derision, contempt and even aversion. There have been fundamental changes in society throughout the life course of today's cohort of people in the third age. The aging population is progressing from being primarily a group that society must do something about to a growing group of active citizens in good

health, who are financially independent, and many of whom have and are preparing for their aging in various ways. Stereotypical understandings of old people in the past have, despite good intentions, resulted in design solutions of furniture and other interior products with, “institutional”, “medical”, “aging” and “disability” connotations. These products can be experienced as having meanings and content that is detrimental and harmful for people and decreases their quality of life.

People have within themselves an image of who they are or want to be. Their desired self-image is a central aspect to take into account in the design process. Adults often perceive themselves to be younger than they actually are. This can be seen as a defense reaction against the general negative picture of old age. In design for people in the third age, the design team has complex task of defining the group of end-users in a way that they feel comfortable belonging to that group. A particular problem is that the older we get, the more unlike one another we become. There is no such thing as the average person in the multiple age phase of the third age.

2.5 The meaning of the home for people in the third age

A home is more than a roof and functionality. Living and interior products are an important part of our wellbeing, our cultural and social identities, our joys and our social life. The home is also often said to become more important due to the instability of the outside world, globalization, and increased speed of technological innovation (Winther, 2004). Alain de Botton (2006) states that our homes and the interior products we fill them with make a deeper impact on us than we think. This can be to such an extent that we are different persons in different environments and that where we are heavily influences who we can be. The architecture’s task is to stand as an eloquent reminder of our full potential (de Botton, 2006). The home is very important and has a great impact based on different dimensions such as self-determination, independence, safety, meaningfulness and freedom (Enable-age, 2010). Findings also indicate that the home has a central place and becomes more important in the lives of very old people because this is where they live and spend so much time (Dahlin-Ivanoff, 2007). Eva Hurtig & Jan Pausson (1968) even state that the home is the individual’s most important asset in old age.

The meaning of home consists of many symbolic, pragmatic, and physical aspects. There is a basic conflict between the desire to express individual style, taste and social and personal status through the home, and a desire to maintain the home as a space that is comfortable and relaxing, and where authentic, genuine personal values can be

fostered (Woodward, 2003). The home with its aesthetic expression comes to constitute a boundary between self and others, through different narratives on family and the self versus materialism (ibid.). Jean-Sébastien Marcoux (2001) has studied the consequences for old people when moving into a small place with a smaller set of things. This move is accompanied by the compulsion for the people to divest themselves of some of their belongings, a process that is called “casser maison”, literally “breaking the house”. It pertains to a ritualized form of construction of the self through the emptying of the place. He states that people inhabit their things as much as their place. Provided that possessions are important to such an extent in the creation of place and in the sense of a “maison”, it is common to hear among the old people in the process of moving that it is the things themselves that make the house *their* house. Possessions are often considered to be at the heart of the construction of the home (Marcoux, 2001).

2.6 Existing recommendations on furniture for people in the third age

Existing recommendations on furniture for old people often take as a starting point the physical, psychological and cognitive decline that aging may bring. The approach is from an expert’s view that represents the interests of the user. One of the few existing recommendations that particularly refer to people in the third age is that the most active among old people require chairs that facilitate ingress and egress and that provide seated comfort while not restricting movement (Holden, Fernie & Lunau 1988). Chairs that stimulate different sitting positions are recommended, because constrained sitting is bad for everybody’s health (i.e. contributes to chronic disorders, muscle pain, impaired circulation, etc.) (Lueder, 2004). Because this research goes in line with an inclusive design approach, it is suggested that designers understand the use limitation and possibilities and develop solutions that can respond to possible future changes in human abilities that aging may bring. In the report, *Furniture for the Elderly*, Sten Engdahl (1968) presents documented knowledge and experiences about the demands for functionality and technical quality on furniture for the elderly. CEN/CENELEC (2002) points out that the needs of older people and people with disabilities are not being adequately addressed when other standards for everyday products, outside of the area of assistive technology and accessible building design, are written or revised. The changing human abilities of older people to consider in furniture design may be sensory (seeing, hearing, touch and balance), physical (dexterity, movements, strength and measurements), and cognitive (intellectual and memory). The needs and abilities of people change as they advance from childhood to

old age and the abilities of individuals in any particular age group vary substantially. It is important to recognize that functional and cognitive limitations differ from comparatively minor ones, such as a mild hearing loss or use of glasses to read, to blindness, deafness or the inability to move part or all of one's body. According to CEN/CENELEC (2002), it should be noted that although some limitations may be minor in nature, in combination, as is the case of aging, these can pose a significant problem.

People with no useful vision depend mainly on tactile and acoustic input. People with a visual impairment are at an increased risk from sharp points and edges on products being handled, particularly if the user relies on touch to identify features and physically unstable items that might fall out of reach. The ability to maintain balance and avoid falling is dependent on a complex system, which involves the brain coordinating visual stimuli, feedback from the balance mechanism in the ear and movement of the limbs. The incidence of balance impairments resulting in falls increases with age. Age-related attention deficits and visual impairments can reduce the ability to avoid hazards and to react to loss of balance. Many impairments in movement such as restricted range of movement in the joints of arms, legs and spine are experienced in older age, which can result in difficulties in daily living, such as reaching things, dressing, sitting down and getting up again. Reductions in muscle power and stamina are common in old age resulting in impairment of strength. Control of passive movement can be impaired resulting in difficulties (e.g., lowering a heavy object to the ground or sitting down on a chair). Failing memory affects people's ability to recall and learn things and may lead to confusion. People can forget what they should be doing before they complete a task. Design needs to ensure that systems are "fail-safe" (CEN/CELELEC, 2002).

Hallberg & Nordström (1981) have carried out detailed studies on the extent to which furniture and other interior products that old people have are suitable from a safety and comfort perspective. Their question has been if efforts to adjust furniture and light fittings to the aging person's preconditions would improve the ability to stay and live in the home for as long a period of life as possible. They point out that recommendations for improvements must be seen both from the household's owner as from a caregiver or home helper/nurse perspective. Marianne Nyberg (1984) has video filmed about 50 retired people in their homes to find out how they use furniture. The findings showed that homes frequently have insufficient functionality and safety and that many old people did not get round to making changes. Others tackled such problems as uncomfortable chairs or bad lightning. Even for them it may be difficult to find proper alternatives, as the range offered on the market is limited or difficult to find.

3 The included studies

The two qualitative user-centered studies described in papers A and B present and discuss methods and findings. The studies investigated the early phases of the design process with attention to identifying various end-user needs. Focus group interviews and situated interviews in homes were the methods chosen. The implementation of study B was a consequence of study A. The methods chosen were considered appropriate for creating a holistic view of how people use and live with products to socially construct their reality. The objective of the interviews was to involve today's and tomorrow's people in the third age, letting them express their needs and aspirations. Methods that solely involve observations limit the researcher to describing his or her own observation of what others experience. The purpose of the studies was to generate and further develop new knowledge that is applicable in the practice of design. The perspective of the studies was that users are experts of their everyday lives and that their experience and knowledge are needed as a resource in design.

In both studies, participants were recruited who were or were expected to be characteristic representatives of the growing population of people in the third age. They were expected to have increased purchasing power and increased demands on various aspects of products. They were also characterized by the fact that they decide, pay for, use, and live with the pieces of furniture themselves. The participants can also be called "experienced users" due to their many years of living in and using their own everyday interiors and making decisions about them. Since it was the participant's existing homes that were the topic of the discussion, the individuals' furniture and other interior products became the mediating objects.

The two papers present and summarize the results of the studies with selected quotations in order to bring user needs and aspirations to life. The quotations were chosen to highlight common and shared opinions but also to illustrate diverse views between individuals and groups such as age groups and gender groups.

3.1 Paper A. Focus group interview

Paper A, *Furniture Design beyond Usability*, presents a focus group study. It was an initial study in the *PLUS-project's* user-centered approach. The specific aim of the study was to gain more knowledge and better insights into what the consequences of an extended life phase mean to people in the third age. It was also to gain an understanding of how people feel and think about changes when moving to and living in a newly built apartment particularly developed to fit the needs of seniors. What impact does this have on their opinions about furniture and other interior products? When they moved to their new apartments, the living area for all participants was reduced. Most of them had previously lived in single-family dwellings. The apartments that they now lived in were in tenant ownership associations and varied in size from two to four rooms including a kitchen; they consisted of 69 to 135 square meters. Three focus group interviews were carried out. The interviews took place in a shared premise of each tenant ownership association, a room that was easy for the participants to get to and were on their home ground. This was done to make them feel more secure than if they were in an unfamiliar environment. Twelve people aged 59 to 93 took part. The considerable age span of 34 years, where the youngest in fact could be a grandchild to the oldest participant, shows one aspect of the complexity and that people in the third age hardly can be considered as a homogeneous group since they belong to different generations.

The focus group interview method was chosen for the exploration of new concepts and identification of new opportunities, as questions with an open-ended nature can be examined (Krueger & Casey, 2000). The information gained is qualitative and consists of experiences, opinions, ideas, and motivations for behavior that is not suited to be quantified or generalized (Bruseberg & McDonagh-Philp, 2002). The principal advantage of focus group interviews is the ability to use participant interaction to gain in-depth and rich data that would not be obtained through individual interviews. The method is also suitable for understanding user needs beyond usability. Focus group interviews are widely used in human factors, social sciences and market research, but not so frequently in design research (ibid.).

The selection of people, places and occasions was made considering the fact that relocation in general is a major event in life. Relocation to smaller housing may, in particular, be a critical event that highlights people's relations to their possessions and entails new needs for furniture and other interior products. The intention was that the participants should correspond to the target users of the *PLUS-project*, as examples of individuals in the third age of today or tomorrow that could express important

demands on products. An assumption was that the participants were affluent, since the apartments were in the high price range, had high standards and were situated in areas considered attractive. The focus group study asked the following questions: How do today's people in the third age think and reflect when they change homes? What are their needs, wishes and aspirations? What are their preferences and why? The emphasis was on what the participants did with furniture and other interior products when they moved to newly-built and smaller housing. The interviews consisted of questions in a sequence of themes: 1) New housing, 2) Changes, 3) New needs, 4) New wishes, and 5) Ideas for improvements. In the analysis, similar trends of design-relevant findings were drawn together and discussions were compared to reveal patterns. The data was then examined as to how trends and discussions related to the variation between individuals and between groups.

3.1.1 Outcomes of the focus group interviews

The results of the focus group interviews point at demands on products that support the physical, psychological and social changes brought about by aging and moving to a reduced housing area. Desired products ought to correspond to the individual's identity of being independent and self-determinant. Results from all three focus group interviews demonstrate that moving to more compact living is a critical event. It involves changes in housing that take time to understand. An aspect mentioned regarding changes in the living situation was the spirit of togetherness. This may have an impact on the notions of privacy and public, to what extent the homes focus on relaxation and informalities or formalities and hospitality norms. Another aspect was that the move required a massive reduction of possessions and resulted in the need for another type of furniture and other interior products. The new demands indicate furniture and interior products that are not large and ungainly, but rather small and dainty. In addition to basic values, the findings call attention to various needs and aspirations such as extra pleasure, extra aesthetic experience or some kind of extra "kick". Many of the participants expressed that the reduction of possessions was emotionally tough and time consuming. Owners were often anxious that certain possessions should be inherited by their children or in other ways stay in the family, or have a future life pleasing others somewhere else.

3.2 Paper B. Situated interviews in homes

Paper B, *Wishes for Furniture design among Persons in the Third Age*, presents a study

aimed at gaining deeper understanding and insight into the life phase of people in the third age and individual needs, wishes and aspirations for furniture and other interior products. It also aimed to gain enriched knowledge about how end-users ascribe values to things and prioritize those values. This was accomplished by meeting people in their own homes, listening to their lived experiences, hearing stories about their everyday lives, finding out about their views and understanding of how they live with and use furniture and other interior products. The context and the degree of sensitivity applied to it are key ingredients in studies with users for radical new products (Veryzer, 2005).

A situated interview method was chosen because it establishes a close connection to how people live in, use and are affected by the living environment. Eighteen people aged 53 to 82 took part in the study. In all, twelve interviews were carried out, six with people living alone and six with couples living together. A thematic interview guide was used, covering themes such as comfort, pleasure, interaction and ideas of improvement of furniture and other interior products. The results from the focus groups in Paper A were used as the starting point and inspired the open thematic interview guide. Part of the interviews consisted of the researcher and interviewees walking through a choice of rooms to enhance the close connection to the furniture and other products in the home as a mediating object. What sets this qualitative “go-along” technique apart from methods such as participant observations and traditional interviews is its potential to access some of the transcendent and reflexive aspects of the lived experience in situ (Kusenbach, 2003). In addition to the mediating objects in the participants’ homes, a portion of the interview asked about pictures. The purpose was to elicit the participants’ reflections from images of a selection of ten different easy chairs in relation to their home.

3.2.1 Outcomes of the situated interviews in homes

The results demonstrate that products perceived as comfortable, flexible and pleasurable lead to attachment and emotional experiences, such as dignity, meaningfulness and freedom. Almost all answers about perceived pleasure in the home had to do with feelings of freedom and not being confined into one’s home. Several participants thought that light and airy rooms with comfortable furniture are more important when you get older. Many expressed that the interior should be suitable, comfortable and pleasurable for them here and now in a pragmatic way. Those that had moved to a smaller place and reduced their household goods (some of which were precious and inherited) had the overall experience that the individual appraisal of quality was more important than current design trends. Some wished that the next

generation would also be delighted by their furniture. The objects of greatest affections have a sense of history or charm about them; many participants valued old as well as new pieces of furniture with narratives, original as well as those added over time, that give a feeling, a relation and/or associations with memories of the past. Some of the aspects that people ascribe to meaningful objects may thus be described as attachment, symbolic values and values of cultural/family heritage. Different aspects of sustainability were also highly valued: timeless appearance, functionality and beauty over time, non-breakable quality, adaptable and the easy to clean and maintain, change and reuse. In the interviews, a perfect interior in general was described as more coherent, modern, comfortable as well as lighter and airier. Pieces of furniture that were experienced as stereotypical, ordinary and conventional were considered boring while, on the other hand, funny form and small details could bring joy to users. The results indicate a growing importance of keeping things in order when moving, the older you get and the smaller the living areas.

The situated interviews provided a picture of individuals with a strong desire to avoid losing their independence and a fear of being forced to move to a residential care facility. Many said that they tried to avoid this by keeping healthy in all ways possible. Living rooms and walk in closets were used for physical training. Most of the participants seemed to be active. Several wanted their homes to express peace and quiet but also provide inspiration and motivation and to facilitate activities. Several of their wishes for home interior changes had to do with improved opportunities to be together with others, such as more space in general or improved furniture qualities such as dinner tables with easy extensions. All participants had computers and internet access. Some appreciated and prioritized the location for their home office in relation to other locations in the home.

Some, mostly among the youngest generations of participants, showed how they prioritized the importance of various values on furniture and other interior products by expressing that they gladly would pay for what gives them pleasure. Others, mostly in the older generations, said that they were careful with their money.

Not unexpectedly, the group of participants was very heterogeneous when it comes to individual variations in wishes and opinions. For designers, it is vital to have insight and respect for this. Humans have diverse demands, past experiences, expectations, preferences, dimensions and capabilities. Houses also have various preconditions such as type, floor plan and style. Different kinds of relations to furniture and other interior products are valued and prioritized differently depending on the situation and the individual's gender, age, and social background.

4 Discussion

As might be expected, the results on how people in the third age interact and perceive their furniture and other interior products are heterogeneous. Without a clearer definition of a specific activity, the target group and the context of use, it is not reasonable to generalize and develop recommendations or specifications from the results. Nor can details and subtle interactions be fully captured in a specification – or even in the minds of. The strength of the results can instead be found in the capacity to encourage design practitioners to develop proper design solutions and other actors in the system of furniture development to make sensible and well-balanced decisions in the design process.

4.1 Discussion about methods

The aim was to explore how various user-centered design methods could be combined, modified and practiced to create conditions for the design of totally new or improved products. A hypothesis was that combinations of different methods were needed to get a wider picture and achieve knowledge of various end-user needs.

The focus group study provided rich knowledge about the consequences of relocation and people's needs and aspirations. The study provided some knowledge, but not enough, into the context of living in the home, and how the participant interact and were affected by the living environment of their home. Physical objects in a physical context would probably offer enriched knowledge. Another factor influencing the outcome was the unspoken norms and the contradictions between what users say they want and what they actually end up doing. The interaction within the group may also have influenced comments and statements in other ways than they would have happened in individual interviews.

The questions in the focus group interviews captured the participants' active needs. Their interaction in the interviews elicited in-depth and rich findings about needs among different generations, needs that the participants took for granted and different perspectives on various needs. The results from the interviews did not

provide satisfactory information regarding the interface of furniture and other interior products. Instead, it provided information about the daily lives of the users and their aspirations. Although there was no physical interaction with products in their context of use, the validity of the focus group interviews can be justified on the basis that the participants had *use experience* in their homes, and so carry with them the context of home. By this is meant that whatever the elicitation context, users with *use experience* can imagine themselves in their normal use context and base their statements on this image instead of on the one presented to them by a specific representation (i.e. *mediating object*) (Engelbrektsson, 2004). A study carried out in the context in which users lived was thought to provide deeper insights into end-users' needs, wishes and aspirations related to everyday interior products than the focus group study. A focus group interview has an advantage of enabling a small-scale study and still be useful.

The situated interviews in homes provided rich opportunities for the researcher to study the appearance of the living environment and the relation between the issue in focus and the living environment. Being on home ground may also make the participant feel more secure and improve the ability to capture and elicit needs than it would be in an unfamiliar environment. The impact of the authentic environment enabled the researcher to observe human-product interaction in the context of use in everyday life and raise and elicit situational issues. A difference between speaking about something present in contrast to something absent in the interview situations is that the proximity to objects made it easier for the participants to express their experiences, opinions, ideas, and to motivate their behavior. It also made it possible for the researcher to ask consecutive questions to elicit needs that the participant, for example, took for granted or that were not yet active. The secure home setting and the proximity to objects in the interview situation may make needs that are hard to verbalize easier for the participants to express. It is often easier and more natural to perform an interview in real use situations. Being situated in the participants' home, among interiors and pieces of furniture in their context of use, provides the researcher with a deeper understanding and enriched empathy for the users. Pictures taken during the interviews may, but only partly, transfer that understanding. An aspect influencing what the participants said, and consequently the results, is the impacts of an unknown researcher in their home. Another aspect influencing the results is that six out of twelve of the situated interviews were carried out with couples living together; there may be contradictions between what users express individually and as partners.

The focus group interviews emphasized, in contrast to the situated interviews, various views and attitudes towards changes, needs and aspirations, and a rich knowledge base of the consequences of relocation. The results from the focus group interviews became

an important base for carrying out the situated interviews. The situated interviews, in turn, added many deeper insights and understanding to the focus group interview results in the interplay in between user, products and the context where the products were used.

The methods used almost exclusively generated findings related to the participants' current abilities and situations. The only exception was the part in the situated interviews where ten pictures of different pieces of furniture were shown to the participant as additional mediating objects. This modification was useful and elicited additional information about desirable furniture, as complementary findings. For the individual it was difficult to speculate on future needs since they depend on one's health. An aspect that also influenced the ability to think about future needs was the participants' aspirations to live in the present. Future needs seemed in some cases not to have crossed their minds, since they not were in that situation. The studies in the two papers presented involved a limited number of people with something in common and assumed similarities that were relevant to the study. The studies explicitly focused on the end-user perspective. In the design process, there are more views to consider and balance. Those who use the results have to consider them and decide the degree to which they can be applied to their situations.

According to Lena Sperling et al. (2005), the success of a personal interview in communication with users to a high degree has to do with how the designer approaches the user. It is important to create an equal dialogue, addressing the user as the expert of his/her problems in the use of the actual product (ibid.). User-centered methods *with* users require skilled interviewees that are aware of their bias and have sufficient sensitivity and empathy. This is something that may be learned and developed through using user-centered methods with the aim is to help users to participate in design. In the practice of design in the area of *Aging and Design*, it becomes especially important to exposure designers to old people to recognize situations and expand their empathic horizon because they usually tend to have different experiences and expectations.

4.2 Discussion about findings

To broaden the knowledge base, the findings of the two studies are brought together and discussed in this section. The other goal, to create knowledge about user communication, will also be discussed.

The findings captured in the studies presented are qualitative and consists of experiences, opinions, ideas, and motivations for behavior, rather than figures and facts. The findings are not suited to be quantified or generalized. Attempts have been made to classify the participants' positive comments on product qualities. A series of user requirements was formulated for future *PLUS-products* using the concept of usability and in a framework of product experiences. This thesis does not attempt to classify the findings because of the risk that vital in-depth results will be filtered out in the effort. The attempts to classify the participants' comments were nevertheless fruitful as a means of summarizing the findings and as a basis to further improve the communication of various needs.

Major aspirations of the participants in the studies presented in the papers were to live in and take care of their homes as long as possible, in order to remain independent and to improve quality of life. People in the third age are by definition striving for an active and independent life. The findings show that the home is very important and has a great impact on people's wellbeing. Many people in the third age seem, according to the findings, to strive for independence, self-determination and security. Living in a supportive and accessible environment may provide this.

The findings presented in the papers show a diverse mix of ideas of the values that furniture and other interior products may have. Answers demonstrated that it is not enough with one improved aspect – a combination of positive values co-act and reinforce each other. Common usability aspects that were needed and valued were comfortable, ergonomic, practical and sustainable furniture and other interior products that are easy and convenient to handle, move, clean and maintain. General positive aesthetic experiences expressed by the respondents were dainty and light furniture and interior design that had visual balance and made the rooms seem more spacious. Warm, soft and rounded were some tactile experiences commented on as positive. Interaction with furniture and other interior products that elicit positive experience of meaning can in general be characterized as reflecting the user's identity, creating a homelike feeling, and not being seen as typical for elderly or disabled people. The results show that general emotional experiences worth striving for are attachment, inspiration and motivation, feelings of freedom, dignity, independence and spirits of togetherness.

A central aspect that was needed and valued by the participants was "comfort". Keith Slater (1985) has attempted a scientific definition of the term: ". . . a pleasant state of physiological, psychological and physical harmony between a human being and the environment." The feeling of comfort, no discomfort and discomfort is determined by the input from the senses and the processing that is influenced by the history and

the state of the person (Vink, 2002). However, it seems that there is no single pattern or cultural definition for comfort. Like so many other things, it is a matter of personal choice. The participants in the studies used the term “comfort” to describe various factors such as efficiency, ease of use, recreation, relief, wellbeing and intimacy. Akiko Busch (1999) writes in her book, *Geography of Home, Writings on Where We Live*, that: “People do disagree so profoundly about what gives them comfort.” She states that the comforts of home are inextricably linked with history, and that we find greater comfort in informality (Busch, 1999). Peter Vink (2005) states that it is surprising that there is no generally accepted notion of comfort or discomfort that allows them to be easily incorporated into the design process. Because of this, industry also lacks a reference linking comfort and design. Some designers have found that the best way to engineer comfort into their products is to involve the end-user in the process (ibid.). Furniture and other interior products that were flexible in their use were also an aspect that the participants valued and express needs for. The cultural definition of flexibility can also refer to many things for different actors. The analysis of the interviews shows that the term “flexibility” may mean variability, adaptability, adjustability, multi-functionality, the products ability to change to the living environment, modification, compatibility, exchangeability, future repair or future upgrading.

A finding that struck the author was that almost all comments about perceived pleasure in the home could be analyzed as having to do with feelings of freedom and not being confined to one’s home. This indicates the importance of starting out from emotional aspects in the design process. These findings also constitute a contrast to the existing negative picture of old age and highlight the importance of capturing new life styles among old people. These findings reinforce the author’s belief that this is a topic worth studying, and that there are brilliant opportunities for the development of considerate design solutions that not only are desirable to own for people in the third age but for people in other life phases.

A basic condition for a design process is a description of the intended target group. It is also vital to know what the acquisition of new products is competing with. It might be things in other categories or services. The results show that it can be trips and tourism, products for health and wellbeing to retain one’s independence, financial help to grandchildren or contributions to charities. All the furniture and other interior items purchased by people in the third age seem to be replacement products. Several of the participants wanted to keep their furniture and other interior products even though they were not considered to be suitable from a usability perspective. The acquisition of new products is also competing with what underlies the keeping. Jon Pynoos et al. (2003) states that old person too often adapt their behaviors to their

environments, rather than change their settings to meet their needs. An environmentally sustainable design approach can include the extension of a product's life span through design. One can learn from the users' motivations for keeping things. The product lifetime is a result of the user's decision and not a predetermined design criterion. The findings have generated knowledge that attachment, symbolic values and values of cultural/family heritage may be users' motivations as to why they do not replace their furniture.

Recommendations for furniture for people in the third age distinguish themselves to a minimal extent from recommendations for furniture in general. However, more consideration should be paid on serving the widest range of ages and abilities, various aspects of comfort and the fact that many people in the third age may move to living that is more compact. Only focusing on existing recommendations for furniture for old people, though, may lead to impersonal products that lack human sensitivity, evoke predominantly negative associations such as helplessness and decline. Instead, the emphasis should be on the users' individuality, aesthetic sensitivity, self respect and expressions of such things as freedom, independence and self-determination. Of course, aspects of usability and accessibility for old people should be considered, but they should not necessarily be accentuated in the design solutions. The recommendations this thesis offers are universal because they respond to the needs of diverse groups of users and are in line with the thoughts of *inclusive design*, where the goal is to develop products and services that can meet the needs of the whole population.

Bridging a user-centered way of thinking to the system of product development can be seen as the designer's field of work. Designers can benefit from being closely involved into the creation of end-user insights, to ensure that the findings are adequate for the present challenges' specific needs and the knowledge embrace a holistic perspective on humans' diverse needs. User involvement can enhance the designing process through deep immersion into the user experiences, aspirations, and wishes and avoid false assumptions. There are two points in particular to make about moves towards user involvement in design (Harper & Eason, 1984). The first is that users do not come with expertise in design procedures and need help to contribute their knowledge and criticisms. The second point is that broadening the base of the design team may not be welcomed by technically oriented designers. It may mean that they cannot make assumptions about the design specifications because their brief may be challenged and changed. It may also mean that the design process is less about "rational" problem solving and more about managing a social process (ibid.). People in the design process, especially designers, should be closely involved in gathering knowledge. The reason for the low employment of empirical models in the design

process can, according to Gülay Hasdogân (1996), be sought both on the side of the available tools provided by theory and on the side of the design practitioners.

Some of the companies in the *PLUS-project* reduced the findings of the studies to subjective thinking and rejected the results. The dissatisfied representatives of the companies considered the studies to consist of too few interviews and consequently not enough substance for the establishment of design specifications. However, some companies were satisfied and appreciated the findings. The different opinions on the value of the studies and their findings may depend on differences in what kind of information designers and business people use as a basis for decision making. Roger Martin (2007) claims that, for designers, reliability is the most important and the only way to know if one is right is to test the product, in prototypes or in real life. For business people validity is the thing to trust; that is constructed by checking numbers and making prognoses of historical events (*ibid.*). Understanding others' understanding requires, according to Klaus Krippendorff (2006), listening to what they say they experience and acknowledging their understanding as legitimate, not inferior or mistaken, even when it deviates significantly from one's own. Krippendorff (2006) has called this a second-order understanding and wants us to note that such an understanding is absent in technology-centered design. There is a risk for misunderstanding and loss of in-depth understanding when summarizing and categorizing second-order understanding.

This research has tried to generate findings about end-user needs that are important for the design of desirable pieces of furniture and other interior products. But the findings may be both incomplete and partially incorrect because the users may not know and cannot say precisely what they want and about their situations, what is referred to as "sticky information" (von Hippel, 2001). This is partly because some knowledge is tacit: knowledge that is difficult to transfer to another person by writing it down or verbalizing it. People are often unaware that they possess tacit knowledge, or how it can be of value to others. An iterative process of design by trial-and-error typically ensues in user-centered design. The manufacturers have to respond with design solutions that may only be partially successful. The user then applies the product in the use setting, finds flaws, and requests corrections. This cycle continues until a satisfactory solution is reached (von Hippel, 2001). This is because users have need information that is *sticky*, and they must engage in learning by doing to clarify what they really want.

4.3 Contribution

The results of this thesis indicate that it is possible to gain an understanding of how people in the third age interact with and perceive their furniture and other interior products. This user involvement has led to enriched knowledge about their needs, wishes and aspirations. The results also show that people in the third age are active users and capable of identifying their needs and of expressing specific demands.

The findings on how to communicate with users may be most beneficial for companies that want to enhance the story of their brand as listening and considerate and strive for a design philosophy where products can be marketed with slogans such as, “designed and developed in close collaboration with end-users.” The findings on user needs may be beneficial for all companies aiming at a more inclusive approach or senior markets. Innovation and new product development must be guided by an understanding of user needs. Starting with up-to-date and reliable end-user needs may improve several phases in the design process: problem finding, analysis, synthesis and evaluation. A deeper knowledge of users’ needs may help in the development of tools for supporting decision making in later phases of the design process. It is now hoped that this research will stimulate the development of tools, design principles and design criteria supporting further design of *PLUS-products*.

5 Conclusions

The image of and attitudes towards furniture intended for old people deserve to be changed. A variety of new lifestyles place new demands on personalization and how products fit into a user's life. Designers need to holistically understand the users, because they make decisions related to which meanings should be afforded by their design solutions and which are to be discouraged. This increases the importance of a user-centered design approach in the system of product development. A challenging aspect in the design process that indicates the need of user involvement is the complex task of defining people in the third age as target group in a way that makes them feel that they belong to the group. There is still a lack of knowledge about the growing senior market that suffers from stereotypes in which aging is associated with something obsolete rather than with innovations. No company wants to be associated with decline. Discovering old people as innovators might be one alternative to increase the business value of life experience.

The attitudes toward involving old people in design processes deserve to be changed. Today's old people are, and tomorrow's old people will be authorities who can take part in shaping their lives and products. If designers do not involve human beings in iterative design processes in their living environment, there is a risk they will be turned into passive receivers of technological solutions and other measurements in a linear system of thought in a time when old people want to be involved. By involving old people in design processes it is possible to capture and address their well-established habits, past experience and wisdom as users of technology, and to create knowledge usable in the development of products that can meet the needs of the whole population in line with an inclusive design perspective.

If decision makers in the system of furniture development only pay attention to the existing recommendations for furniture for old people there is a risk that the design solutions will evoke negative connotations that no customer wants to use, buy or be associated with. Primarily paying attention to one set of variables may cause the neglect of others. The outcome shows that it may be worthwhile to focus on the role furniture and other interior products play in people's lives instead of on furniture as a tool that compensates for bodily decline. Instead, furniture should reflect the identity

of an independent and self-determinant individual, should fit into the users' aspirational homes and interiors and have pleasurable forms and details that can bring joy and wellbeing to users. The findings indicate that the entering into a new life phase, relocation to smaller housing and other experiences and expectations than those of yesterday's old people leads to increased user expectations of products. Sensible and well-balanced decisions in the system of product development that acknowledge those changes are important for developing successful furniture from the viewpoint of users.

6 Recommendations for future work

This thesis has focused on identification on various needs in early phases of the design process. So far, an iterative design process, one of the main principles in user-centered design, has not been practiced or studied. A recommendation for future work would be to carry out case studies involving users and other stakeholders, go further in the design process, select problems and develop new solutions. To explore the generated knowledge and to generate new knowledge, further studies would benefit from involvement of users interacting with new design solutions such as mediating objects. The studies in this thesis include only slightly instrumental human-product interaction. User-centered design studies that help the user to establish what is in his or her interest and may be carried out with physical representation such as existing products or prototypes in authentic living environments or usability laboratories. That can provide more specific findings on various needs, knowledge that would be useful and of great value in the later parts of the design process.

The diversity of lifestyles may also lead to increased numbers of people that do not want to continue to live in their homes. Thus, it may be valuable to study users' interactions with furniture and other interior products in other contexts than in the home. It is also possible that the development of housing alternative, such as cooperatives for old people, will grow. These are housing alternatives where the end users' influence on the living environment is expected to grow. The findings in the included studies also point at end-user needs and wishes for design solutions integrated into the building and furniture and other interior products that fit contemporary and future housing. Collaboration between actors in the furniture industry and the building industry may contribute to integrating interior solutions in buildings, collective approaches and a link to the housing customer. This may reinforce a link in the whole chain of processing in wood and furniture manufacturing.

It is important to highlight cases and role models where old people are actively involved in design processes because the perspective of tomorrow demands a certain rethinking.

In addition to research on user-centered design approach, research on how to reach the growing senior market is needed to ensure future competitiveness and development of the Swedish furniture industry. It is proposed that stakeholder networks should be involved. Benchmarking in other product categories in the senior markets can also be valuable. Conditions for further work in the practice of design are a clearer definition of the intended target group and channels to come onto the market according to each company's category and vision. There are opportunities for significant contributions in the area of *PLUS-products* if user-centeredness would integrate with existing design processes.

As with any research investigation, the findings should be viewed as simply another step in advancing our understanding of the complex relationships underlying various aspects of design. It is hoped that the set of complementary studies, as well as the knowledge presented, will aid researchers in further developing theory and design practice in this area.

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