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UNIVERSAL DESIGN INTEGRATED IN ARCHITECTURE: A PROPOSAL FOR HOUSING THE ELDERLY

HEITOR GARCÍA LANTARÓN

Abstract

This paper compiles the main conclusions of a research project conducted at the Design Department of the Architecture School of Madrid, focusing on the Home Model for the elderly in Europe. The research analyses the development of the design process over the past 70 years through nine Danish examples: From mainstream treatment of the patient to personalized service to the user. The focus of social sciences in this evolution has influenced new policies of the United Nations and the European Union with a view to providing better and sustainable solutions for an ageing population. This paper aims to explain how, with the architectural design approach, Universal Design is the next step in the logic evolution in design for elderly people, and therefore, for any person with or without disabilities.

Keywords:

universal design, specialized design, compensatory models, independence, social interaction, social integration, identity, potential space

Introduction

Existing housing solutions do not meet current elderly people's requirements for living. The understanding of old age changed with the rise of the "young-old" (Neugarten, 1974). These "new users" requires new solutions for covering their needs for successful and active ageing. For enhancing quality, both on the individual and social life-aspects, architectural design originally approached the challenge under a specific and compensatory perspective. Existing solutions need to be revised and updated.

The research conducted focused on housing solutions connected to elderly interests. The main objectives of the research were to outline the architectural characteristics that define the Home Model and to describe its contribution to the enhancement of ageing people's housing needs. The study comprised more than one hundred international examples, including projects from prestigious architects. However, for a deeper study of the model and to establish a contemporary comparative framework, the research was framed in Denmark, which is considered a pioneer country in this field. Various examples were studied with a specific methodology. As part of the research, established relations between the person, the environment and the ageing process, among social sciences and architecture, were included. By tracking the architectural models and the different policies influenced by social sciences, it is possible to follow the origin and development of the existing solutions for housing the elderly: From mainstream treatment of the patient to personalized service to the user.

In conjunction with global trends on housing for the elderly, this paper aims to explain how the parallel evolution of architectural design and social sciences highlights the necessity of implementing Universal Design (UD) in the process. As part of the on-going demographic changes, UD can be considered a solution to the ageing challenge. Its implementation can be firstly on a macro scale, by entering the construction market through the requirements of the elderly. Secondly, through a meso and micro approach based on usability design including the user's paradigm and giving flexible generic solutions that can be adapted to the elderly's personal situation.

Theoretical framework

The relation between person and environment is crucial in architecture and has been addressed extensively. This research project focuses on analysing, under the architectural perspective, the relation of the person and the environment within the ageing process, and how UD can improve that relation. Traditionally, social sciences and architecture have addressed the focus on developing different theories. In architecture, the aim was to provide an appropriate environment to compensate for the problems related to the ageing process, but setting aside the requirements and characteristics of the user. Therefore, in order to redefine the architectural relation established between the person, the environment and the ageing process, this research project includes the three elements in the context (Figure 1).

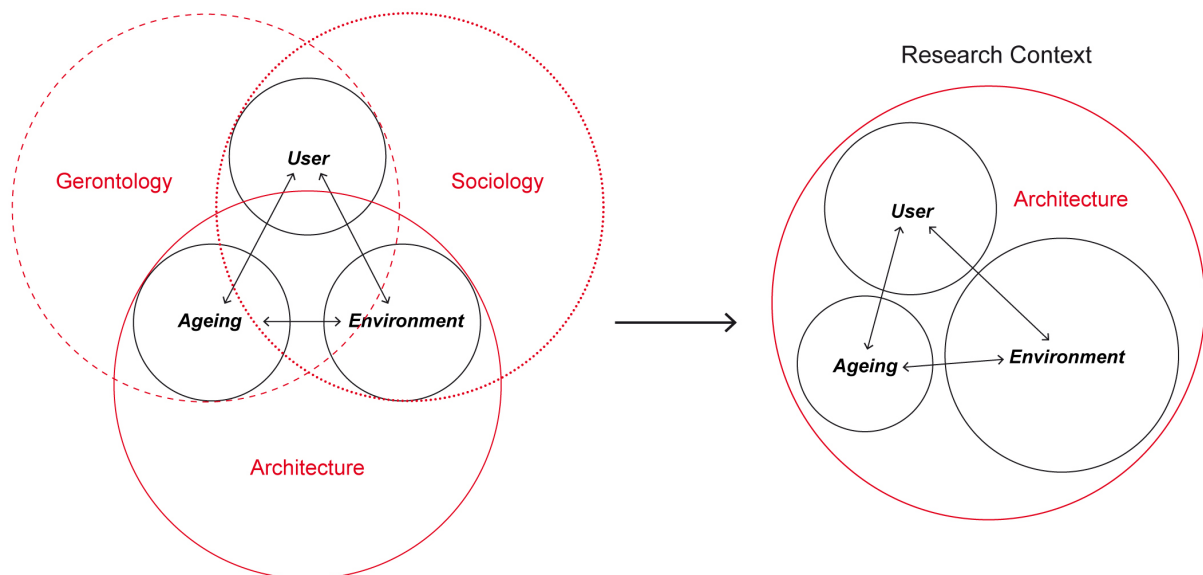


Figure 1
Research Context Diagram. Architecture, Gerontology and Sociology are the main disciplines related to the three subjects involved in this project: User, Ageing and Environment. Traditionally, each field has focused on the specific relation between two of the subjects providing partial solutions to the ageing challenge. Therefore, this research project aim to, under the architectural approach, include all the subjects on the review of the context.

In this study, it is important to highlight that environmental focus is only centred in domestic space. There is a wide range of architectural models for housing of the elderly, mainly characterized by the different health and care services provided. In a generic perspective, the different approaches to the ageing process and the different health systems of the countries determined the policies developed, as well as the existing health provision. In addition to this diversity, the evolution of understanding the ageing process and the solutions proposed added to the complexity of the challenge. Nevertheless, it is possible to define some common characteristics in order to classify the different models as well as the actual trend in housing the elderly. The main current policies focus on allowing the elderly to stay as much as possible in their own home by providing external and personalized services. This is what the majority of elderly requires.¹ Thus, the research object is specifically focused on the interests of the elderly: the Home Model. A well-defined

1 Staying in their own home is a global trend for elderly in all European countries. For example, in Denmark, only 8 % of elderly people live in specially designed housing estates different than their own home (Kristensen, 2007). And in southern countries like Spain, 87,3 % of the elderly prefers to continue living in their own home. This trend continues (78 %) even when some kind of dependency related to ageing appears (IMSERSO, 2011).

division between the services and an accessibility-design architectural environment characterizes this model. This can be defined as:

The homes designed with the ability to adapt to the individual changes, as well as to the social or health care assistance services derived from the aging process; allowing greater autonomy and independence for longer time (García and Soler, 2015).

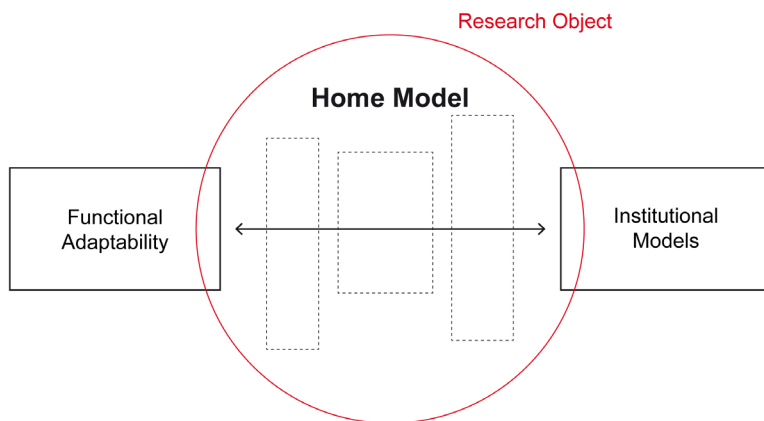


Figure 2
Diagram. Research Object. The Home Model is placed in between the other two main options for housing the elderly: The functional adaptation of the mainstream homes (resulting from the ageing requirements) and the institutions (specifically designed for caring and nursing elderly at a late ageing stage). The Home Model arises as a universal solution for an increasing segment of ageing population.

Therefore, Home Model can be placed between the so-called Institutional Models and Mainstream Housing Models² (Figure 2).

The user focus centres on elderly people. This social collective is defined by diversity, which necessarily affects the different housing models developed for them. In the current context, options mentioned overlap because of the process of adjustment to the user's needs. There is an on-going evolution of elderly people, not only regarding the personal situation associated with the ageing process, but also as a social group representing every segment of our society. As a consequence, the housing models have to be able to adapt to a constantly evolving "user" through an inclusive design.

At the same time, it is essential to discuss the importance of ageing as a process. Ageing has been a basic element defining the different models for housing the elderly, and this nowadays influences the consequent design extents. The importance of ageing is based in two factors. On one hand, it defines and characterizes the elderly as a social group. On the other hand, ageing affects physical abilities as much as mental capacities, challenging the personal relation with the environment.

To summarize, the research context is defined by a specific architectural model: Home Model for the elderly, a specific user: elderly people

- 2 Mainstream Housing models are characterised by a non-provision of health-care services because its design is focused on healthy-young users. Therefore, when some kind of dependency associated to ageing develops, it is necessary to adapt the environment and externally provide the services required. This adaptive process is called functional adaptability. The Institutional Models are characterised for providing care and accommodation at a time. This means an accessible environment and a wide range of health-care services coexisting in the same estate. These models derive from the first examples emerged in the 17th and 18th centuries, which served to care and accommodate any person with some kind of dependency, physical or psychological problem, and also served to control them. The main objection to this model relates to its capacity affecting the patients as it takes away all their autonomy, submitting them to a continuing routine and making them dependent. This model is linked to high dependent elderly.

and finally, the process that influences both: ageing. The evolution of this three-sided relation has developed into the empowerment of a person-centred paradigm, establishing a strong linkage with UD. Henceforth, I will briefly establish the theoretical framework related to these three subjects and UD through an interdisciplinary approach.

Home model:

The specialized domesticity and the compensatory approach

There are two main principles – as a legacy from the Modern Movement architectural theories – that still have a strong influence on current housing design: One such principle is the space specialization in the interaction with function and user. The other principle is the belief that the environment is capable of compensating for the physical shortcomings of the user.

Currently, *specificity* is what defines design, and in particular, domestic space. As a consequence of the unhealthy situation of the housing stock at the beginning of the 20th century, one of the main standpoints of Modern Architecture was to provide quality homes for everyone. For that purpose, a standard user and a standard housing model were defined. From a generic perspective, the way to “design for all” was to establish a standardization model of anthropomorphic measurements in order to place the human body as the basis of any design. The most renowned example to illustrate this approach was Le Modulor, defined by Le Corbusier in 1948–1953. On the generic representation of any user, the main problem was that the chosen model did not include any kind of disabilities, nor how time can affect the personal functional capacities. This generic and non-specific “ideal body” finally became a very specific representation of almost no one. Only a small percentage of users could match such standards. As a consequence, and in order to include representative measurements of the rest of the population, different standards models were developed, including handicapped and elderly (Lambert, 2012). Anthropomorphic measurements developed by Henry Dreyfuss in 1974 for wheelchair users, handicapped and elderly are a good example. All the different standards were specifically focused on each social group; therefore, all these solutions have ended up in a contribution to social differentiation (Figure 3).

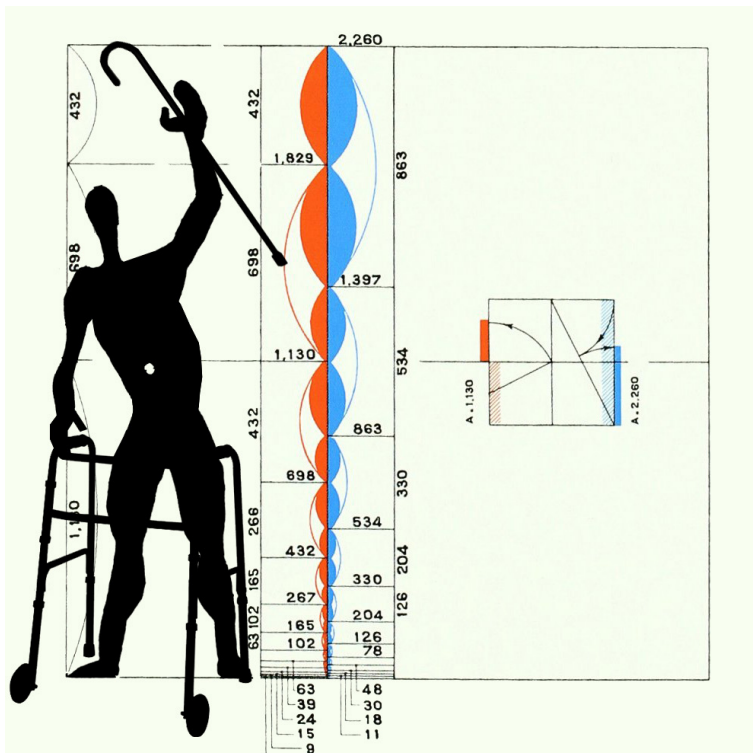


Figure 3
Le Modulor, here drawn by the author, emphasizing how these generic representations of any user developed in specific representations for specific social groups, stressing the differences and increasing social differentiation.

Another consequence of the standardization process of housing the population was the election of the “traditional” family³ as the social unit. A social standard was established, so the housing solutions were designed in order to fulfil the necessities of that standard family. As Ábalos states, “the statistical family, as a mental construct, enabled orthodox architects to objectivize social behaviour and quantify it” (Ábalos, 2001).

All these decisions, made in a former social context, have a strong influence today in the housing market. The mainstream housing models are still focused on the “standard family” and designed under the standards of the “ideal body”. This approach is unable to provide inclusive and up-to-date solutions because the market is characterized by strong specialization of the different products. Only a small percentage of houses are designed for elderly or handicapped people due to imposed policies. Therefore, the market relates to an unreal anthropomorphic ideal for the mainstream solutions based on a limited family standard, and at the same time, a very specific design approach for the unconventional options. In this context, this group is nowadays becoming a larger target for the market even though real estate developers have not incorporated the promotion of homes for the elderly in a long-view perspective.

There is also a strong relation between architecture and medicine. During the early 20th century, Modern Movement theories focused on the minimum requirements of sun, air, hygiene and views in order to compensate the great lack of these characteristics in the traditional housing stock of the cities (Figure 4).

- 3 A consequence of increasing lifespan and decreasing birth rates, the family structure has been affected. The “traditional” family structure is characterized by a horizontal development where the different generations are clearly differentiated on number and roles. On the contrary today, the family structure is more vertical because the number of members is similar. Nowadays, different generation members coexist for longer, establishing new social relations (IMSERSO, 2011).

For as long as history remembers, architecture has followed medicine. If classical theories of the polis followed theories of the four humors, modern ideas of disease have influenced architectural theories in this century (Colomina, 1997).

From this perspective, a health approach of the domestic space highlighted the idea that environment can compensate for and help recover diseases, establishing a strong relation between the Person and the Environment⁴ (Figure 5). Architecture was understood as a solution to enhance everyone's lives.

- 4 The social sciences theories of Person-Environment explain how in an adaptive process there is a close relation between the person skills and the environment characteristics. In these terms, disability can be a consequence of a personal circumstance or a consequence of a bad designed environment.



This generic focus of enhancing everyone's lives has developed into specific solutions, influencing all housing models for the elderly since its origins. In the initial stage, models offered mainstream services based on a "care model". The quality of the environment exclusively focused on illness treatments from a very generic perspective. These are known as hospital-like solutions or institutional models. After the Second World War, with the increasing proportion of elderly citizens, the models specialised on the different stages of ageing. The different solutions became more polarized and specific, but still offering standardized services for everyone. In these models, the user (still considered a patient) is forced to move from one model to another to fulfil the personal necessities. Piet Houben includes these examples in the "staircase model", characterized by a services-centred approach (Houben, 1997).

Since the 1960s, the different models evolved to a more person-centred approach: from patient to user. The aim was to provide the different

Figure 4 (left)
Front page of nº11 A.C. Documentos de Actividad Contemporánea (1933). Magazine published by G.A.T.E.P.A.C (Spanish group of artists and architects linked to the CIAM) with the objective of spreading the principles of the Modern Movement in Architecture. Special issue compiling the minimum requirements for living established on the 4th CIAM conference, later on published as the Athens Charter in 1942 by Le Coubusier and Sert.

Figure 5 (right)
Front page of Arkitekten Maanedshæfte (1941). Special issue compiling different competitions for renewal old institutions showing the strong influence of functionalism on housing for the elderly.

services required by the person in the same environment, reducing the number of removals. These models arise as an option for optimizing the health resources. For Houben, these examples are part of the “bars model” (Houben, 1997). This still means an environment-specific solution, but with personalized services. They are known as the hotel-like solutions or “Three step projects” (Beyer and Nierstrasz, 1967).

During the 1980s, the “person-centred” paradigm developed into different policies in order to include the participation of the user in the housing process (Houben, 1997). This evolution is directly related to the global trend on separating services from the architectural model. There are two main reasons for this change on the paradigm: on the one hand, the social changes started during the 1960s and, on the other hand, the energy crisis of the 1970s. From the social perspective, the institutional models were strongly questioned by authors like Erving Goffman and Michel Foucault. Both addressed the necessity of changing a model that exerts strong influence and control on people’s lives (Goffman, 1961; Foucault, 1964). About the architectural discussion, Team X stated the necessity of reviewing the previously mentioned Modern Movement concepts related to living and housing, addressing the complexity of society as an essential design guideline. From the economic perspective, in order to enhance and maintain the quality of services, most European countries encouraged the provision of external services tailored to the personal necessities.⁵ In these models, architectural design focused on more home-like solutions. Today, active participation and empowerment of the elderly in our society have become key elements for the international policies as a consequence of the social demands.

Ageing process: Social sciences theories

The process that developed in the past as described above is linked to the social sciences approach to the ageing challenges, stating the importance of an interdisciplinary analysis.⁶ There are several theories that focused on the relation between the person and the environment (P-E). The Ecological Theory of Ageing (Lawton and Nahemow, 1973) stressed the strong influence of the environment over the personal capacities of the person. This theory became questioned because it was based on a study of environments in different institutional models where the dependency ratio of the elderly was high; therefore, the personal capacity was sub-estimated. In contrast, the Successful Ageing Theory in conjunction with the Selection-Optimization-Compensation Model (Baltes and Baltes, 1990) switched the focus to the personal capacities on adapting to the ageing changes, balancing out the Person-Environment relation. As a consequence of these theories, but mainly influenced by the current social situation, the ageing policies of the United Nations and the European Union have focused the attention on providing better and sustainable solutions for an ageing population, developing concepts like Active Ageing (WHO, 2002).⁷

5 In relation to this, Denmark became a pioneer country due to the 1987 Housing for the elderly Act (Ældreboligloven), which was focused on the improvement of elderly’s life quality by allowing them to ageing at home. The system was transformed from a long-term institutional model to a wider range of home-service health and care solutions. This policy opened a trend in the rest of European countries so the main focus was the continuity, self-determination and Independence of the elderly (Gottschalk, 1995).

6 Inger Marie Lid highlights that environmental factors and personal circumstances are of importance if disability emerges in a concrete situation. Therefore research questions within this topic should be interdisciplinary and involve the social sciences, medicine and the humanities (Lid, 2013).

7 Active Ageing is a concept developed by the World Health Organization, and defined like: “Active Ageing is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age” (WHO, 2002).

This evolution to a Person-Environment-Activity (P-E-A) model has become an important change on the understanding of design for the elderly. This actual paradigm connects the architectural design not only with accessibility, but also with usability.⁸ The aim is not only about providing an accessible environment; it is about designing an environment that can be used by everyone. At this point, it is important to highlight the strong relation with UD, especially with its definition included in the UN Convention on the Rights of persons with Disabilities 2008 (CRPD). In addition to the link between UD and disability, established by authors like Lid (2014) and Imrie (2012), it is necessary to include elderly people, especially those without physical or mental disabilities. As Lawton (2001) stresses, the UD definition already implies an effort at inclusiveness. This paradigm includes the use of the space, and this use is related to the activities that the space supports. As the concept of Active Ageing sets out the necessity of empowering elderly people and including them as an active collective in our society, the design has to provide an environment that allows them to make active use of it. This approach, linked to UD, shows the trend and criteria of the current and future political/social agenda on most developed countries: stating the focus on an active ageing based on the personal, as well as environmental factors, for increasing social participation (Figure 6).

8 As defined in the study Enable-Age Project of the European Union, “accessibility is based on two components: the personal (functional capacity) and the environment (e.g. architectural barriers) which are completely objective and even are regulated, as in the case of architectural barriers, by legislation. But we must also take into account usability, which is defined by the two previous components but also, necessary to add a third of a subjective nature, as it is based on user perceptions: the activity Every senior should be able to use (action) any environment as any” (Iwarsson, S. et Al., 2003).

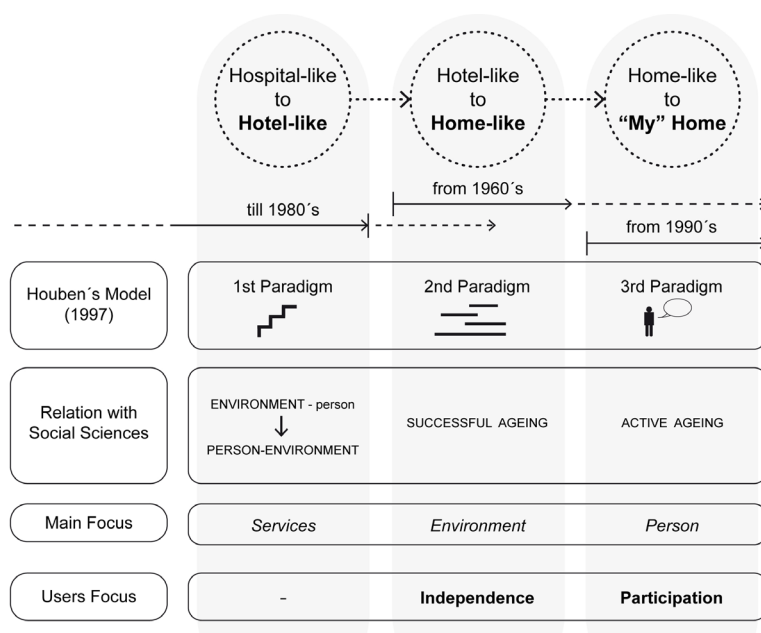


Figure 6
This diagram illustrates the evolution of the different models of housing for the elderly, as well as its relation with the social sciences theories and the models defined by Piet Houben: from the hospital to the hotel, then to the home and finally to the personalized home. During the last 50 years, the main focus on the provision of services has developed to a more person-centred approach and at the same time people's focus has turned more participative.

Elderly: the new user

What defines “elderly” is complexity. Immanent in the increase of life expectancy, there is another recent phenomenon in the history of mankind: an increase of long-life span average. There are more elderly people, and they live longer. This reality must be understood as a great opportunity. Since the second half of the 20th century, this “Abundance of life” has created a new user (Moody, 1988). This demographic revolution has had a great impact in the understanding of ageing. Today, the process is directly linked to the individual’s life experience and is another stage during the life span. Ageing was no longer considered an illness, but a normal and universal condition with different phases that had to be classified. There are two kinds of classification regarding the chronologic age or the functional capacity.⁹ Both approaches overlap due to the close relation between age and function (Fernández-Ballesteros, 2011). As defined by Paul and Margret Baltes (Baltes and Baltes, 1990) in their Selection, Optimization and Compensation Model, the categories are related to the characteristics of ageing, distinguishing between pathologic, normal and active ageing.

It is important to emphasize how the length of the ageing phases is increasing, according to the complexity of this life stage. Therefore, there is a strong socio-demographic influence during the development and definition of the different housing models for the elderly. In 2050, at least one third of the population in developed countries will be over 60 years, becoming the largest social minority (WHO, 2012). This new phenomenon generates new necessities and demands, not for a young and healthy individual nor for a dependent frail elderly, but for an old person, independent and active. This social group is the segment most receptive to incorporating substantial changes in the housing model because their needs either have exceeded, or will exceed, their ability to adapt. Beyond the compensatory capacity of the environment, this collective requires new models of housing allowing them to choose, participate and manage their own way of living, by including their needs and preferences. Elderly people are currently demanding more flexible models that allow them to cover one of their greatest requirements: ageing at home and in place.

Today, the aim is to accommodate elderly regarding to their demands and necessities finding housing models that allow them to live with autonomy, independence and security as much long as possible, but without neglecting one of the most important points and badly disregarded by previous models: social integration.

9 Peter Laslett (1989) distinguished between Third Age (a French concept first used during the 1970’s) relating it to the self-fulfilment and Fourth Age with dependency. Under the chronologic focus and in relation with the increasing life span average, Bernice L. Neugarten (1974) included a new phase in the old stage, distinguishing between Young-Old (55 to 74 years) and Old-Old (75 and over). Over this, M.W. Riley (1988) included another subdivision, the Very Old (85 and over). Other authors, like Herrad Schenk (2008), established a relation between the age and the activity performed by the user: Go-Go’s (55 to 75 years), Slow-Go’s (75 to 85 years) and No-Go’s (85 and over). For Francois Höpflinger (2008), during the ageing process we can distinguish between four different phases with health as a determinant factor: Late adulthood (55 to 65 years), Healthy retirement age (65 to 75 years), Advanced age with increased fragility (75 to 85 years) and Old age requiring assistance (85 and over).

Methodology

The methodology used in this study is based on two main research components. On the one hand, the theoretical framework defined by social sciences and architectural knowledge related to housing options for the elderly, which outlined the research context and the main subjects to analyse. On the other hand, empirical findings delimited by the research object and the analytical tool. Therefore, in this project, a multi-method approach based on a specific strategy (case study), a specific analysis (Ix4) and a specific tool (drawing) were used to compile the characteristics that define the Home Model for the elderly and its contribution to the enhancement of the ageing housing needs.

Strategy

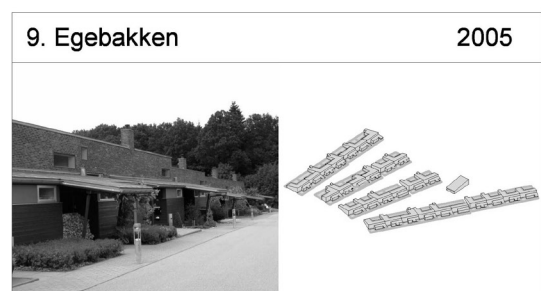
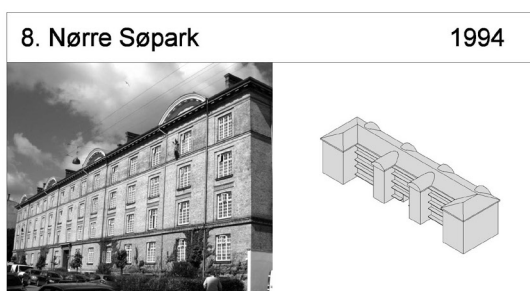
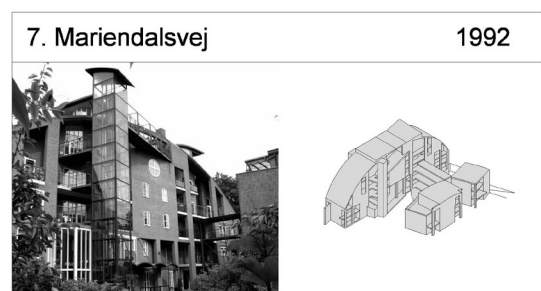
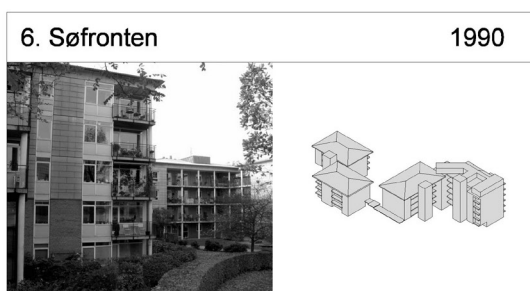
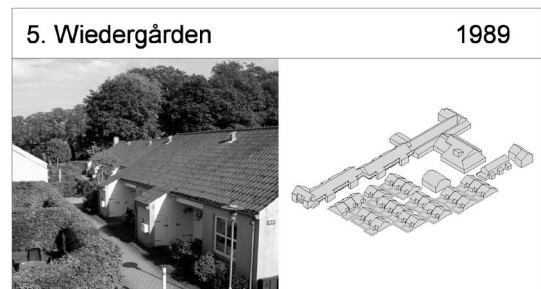
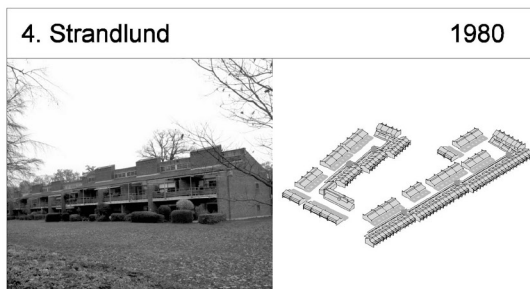
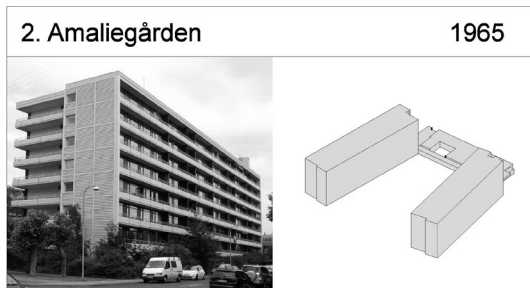
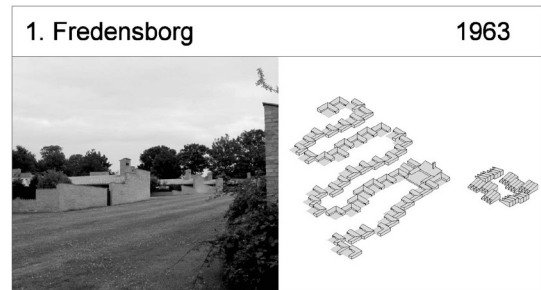
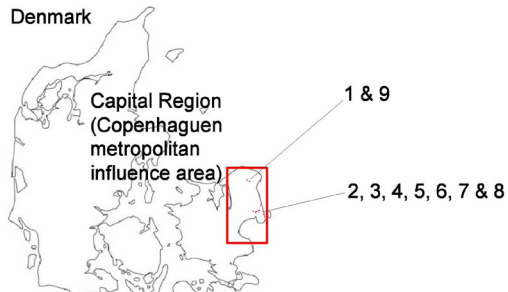
Due to the nature of the subject studied, the strategy chosen follows Yin's definition of Case Study (Yin, 1994) and more specifically Johansson's recommendation for architecture and urban planning research (Johansson, 2003). To conduct case studies, nine Danish projects were selected for an in-depth multi-method comparative analysis. The criteria for focusing the research in Denmark are based on the country's importance as a pioneer in developing specific policies on housing needs for the elderly. This large trajectory focusing on the users' needs has reinforced the development of different housing projects, specifically Home Models; this also explains the high number of cases. Therefore, it is possible to trace the design process evolution through the nine examples and compare them with the progression of the understanding of ageing, the development of the different theories on social sciences and the present trends of facing the challenge.

Four different criteria have been considered for the case selection. First, all the cases are included in more than one specialized architecture publication. Second, all the cases include Home Models for the elderly, even if some of them are mixed projects with institutional models or health facilities. Third, in order to establish future comparative studies with other European cases, all the examples are located in the Copenhagen metropolitan area – in the so-called Capital Region of Denmark – including samples in rural, suburban and urban context. Finally, the range used on the selection relates to the present welfare system in Europe, so the temporary framework is established after the Second World War and follows Gottschalk's evolution of the different Danish models for housing the elderly (Gottschalk, 1995), (Figure 7).

The case fieldwork has been organized along two parallel strands: a theoretical approach and empirical findings. First, all the original drawings and documents were consulted and, if possible, the architects were interviewed. The aim was to compile original information about the project, the context in which it was developed and the design conditions. Furthermore, a visit and an interview were arranged either contacting

the building board, the person in charge of the place or the tenants, to compile information about the use and maintenance of the building. Besides, a photographic report and space measurements were taken in order to contrast the original information within the built reality.

Figure 7
Selected cases. Name, year and location.



Analysis

In the Successful Ageing concept, three main components are included: “Low probability of disease and disease-related disability, high cognitive and physical functional capacity, and active engagement with life” (Rowe and Kahn, 1997). This concept switched the focus to the quality of ageing. It was not only about living more years but also in good conditions. In that case, success during this life period is based on the relation between these three components: health, independence and socialisation. Under the architectural perspective, architects have focus on compensatory design to promote independence and socialisation. This approach mainly framed the design scope both on the physical characteristics and on the different activities performed, but also on the different – health or care – services associated to them. Thus, our research focused on the physical aspects of the home, as well as the facilities and specific spaces related to activities and services. In addition, and linked to the P-E-A model, participation and activity are part of the ageing process, highlighting the necessity of empowerment and reinforce elderly’s identity. Therefore, the elements analysed: Independence, Interaction and Integration – as part of socialisation – and Identity (Ix4 Analysis), are representative of the different disciplines approach regarding to ageing process.

Tool

Considering drawing as the main tool used by the architect to represent and understand the architectural design (Cabrero and Martín Blas, 2012), as well as a common practice on architectural research used by many authors like Susan Komossa (Komossa, et al., 2005), different types of drawing have been used for a better analysis of the selected cases and as a common code on the results representation. The drawing representation is not used to illustrate the residents’ different ways of using the space, because that would only represent a small and partial range of the complexity of daily use. It is used as a tool for representing the space and surfaces in use or potentially used by individuals, highlighting the immanent qualities of the basic physical medium that supports the activities.

Therefore, diverse techniques have been tailored to the subjects under study, including the use of the most common scales on architecture research and representation: urban scale, common space, in-between space¹⁰ and domestic space. Independence has been studied through comparative representation of all home plans, following the criteria established during Modern Movement on house studies. Interaction has been analysed over the common areas through its volumetric representation in the whole residential complex and also focusing on the public-private / interior-exterior limits of the home. The focus on the integration element was mainly on the urban context, therefore the urban plans represent on each example the complexity and characteristics of the area of influence. In relation with identity, the study was focused on

¹⁰ The in-between space is closely related to the “Space Between” defined by the Team X. In fact, it can be understood as a more specific approach to the same concept. Developed by Herman Hertzberger in 1959, it is mainly illustrated with different projects of housing for the elderly. Therefore, it has been included as one of the main elements of this research.

a comparative group of isometric drawings from in-between spaces in addition to fieldwork pictures.

Results and discussion

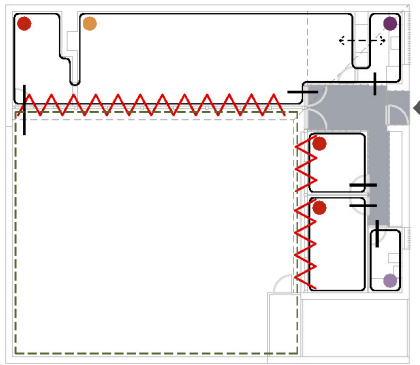
Independence

In relation to *independence*, it is important to conceptualize the scope within two aspects, functionality and autonomy. Independence usually relates to the physical aspects and characteristics of the space. It has a strong functional component. As a consequence of a poorly designed environment, the person can be considered architecturally disabled.¹¹ Therefore, security, protection and accessibility are main characteristics of an appropriate design to promote independence, allowing the disabled person to make use of and do any kind of activity in such environment. This compensatory approach has been the focus of design and policies in relation with housing the elderly, but mainly with other social groups like physically and mentally disabled. It focuses on compensating the problems that already have arisen. UD has a conceptual inclusiveness, thus it can surpass and improve the compensatory approach taking part before the challenges appear. Independence also relates to the idea of autonomy. If independence has a physical dimension linked to the capacities, to what the person *can* do, autonomy is more related to the emotional dimension, to what the person *wants* to do. This means self-determination. To have privacy and maintain control of decisions have a strong influence on the housing needs for the elderly.

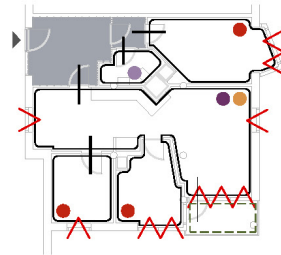
The functional features and the space capacity to adapt to the changes and decisions related to the ageing process have been studied by focusing on the evolution and characteristics of the different spaces defining the house, as well as their position and combinations (Figure 8). The results do not show differences from mainstream housing models, besides the accessibility approach. All models are defined by functionality: both in the circulations scheme as well as in the uses distribution. The uses are linked to the space, meaning specific dimensions for each room. In some examples, it is possible to modify the space connecting the living room to the bedroom, but in any cases is possible to change the use of the space for adjusting to the personal changing conditions, ignoring flexibility in the use of space. The indoor design approach is characterized by traditional solutions in the spatial layout and specific accessible solutions mainly in kitchen and bathrooms. This design specialization responds to specific requirements as a consequence of physical or mental impairments. This results in social segregation by differentiating the housing types from the mainstream housing solutions.

¹¹ The so-called architectural disability can be defined as: “the physical design, layout and construction of buildings and places can confront people with hazards and barriers that make the built environment inconvenient, uncomfortable or unsafe for everyone to use and may even prevent some people from using it at all” (Hanson, 2001).

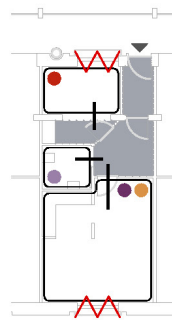
Fredensborg. Type D



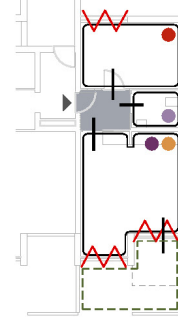
Søfronten. Type BH122



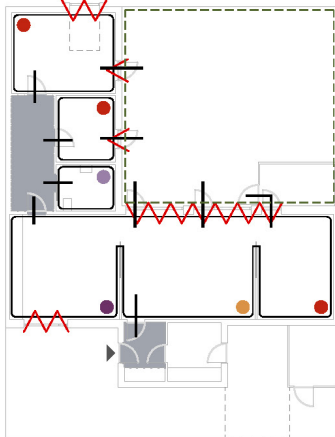
Nørre Søpark. Type E



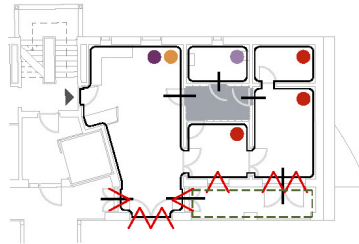
Bomi-Parken. Type A



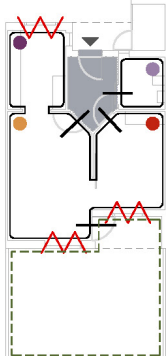
Egebakken. Type 3



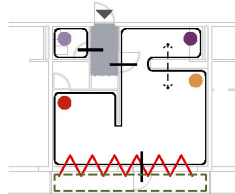
Mariendalsvej. Type 2S 16tv



Wiedergården. Type 2B



Amaliegården. Types E & F



Strandlund. Types A' & B'

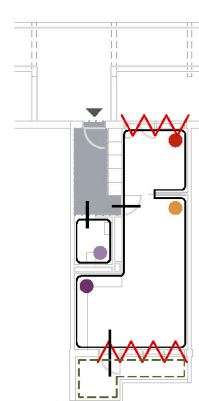


Figure 8
Diagram plans of selected examples for the independence analysis: Position, combination and physical or visual relations between different spaces defining the home. It is possible to compare space continuity among the different rooms, as well as its relation with the exterior, showing the importance of specific design strategies.

Interaction

Home Models for the elderly gives rise to special concern about the common areas for enhancing social relations, one of these areas' main characteristics. Thus, common space has been studied under the design perspective and the activities performed.

For social interaction, the compensatory approach focused both on the in-between spaces and daily routines. Most of the Home Models include facilities with different activities providing services for promoting social relations. The examples studied illustrate how hotel-like models have developed into a self-managed model.¹² The average services provided include restaurant and management. In some examples certain health facilities are included, not only for the residents, but also for the local community. On the other hand, the activities framed in the domestic space are mainly linked to daily routines. These routines can be private or public, but in both cases include the use of the physical environment. As a consequence of the ageing process in individuals, the environment reduces its limits, decreasing both the physical and activity boundaries. On the physical aspect, the facilities, the house unit and the connective space that links them have been studied. In the same way, the relation between the social network and how it is linked to those interactive spaces was also studied in our research.

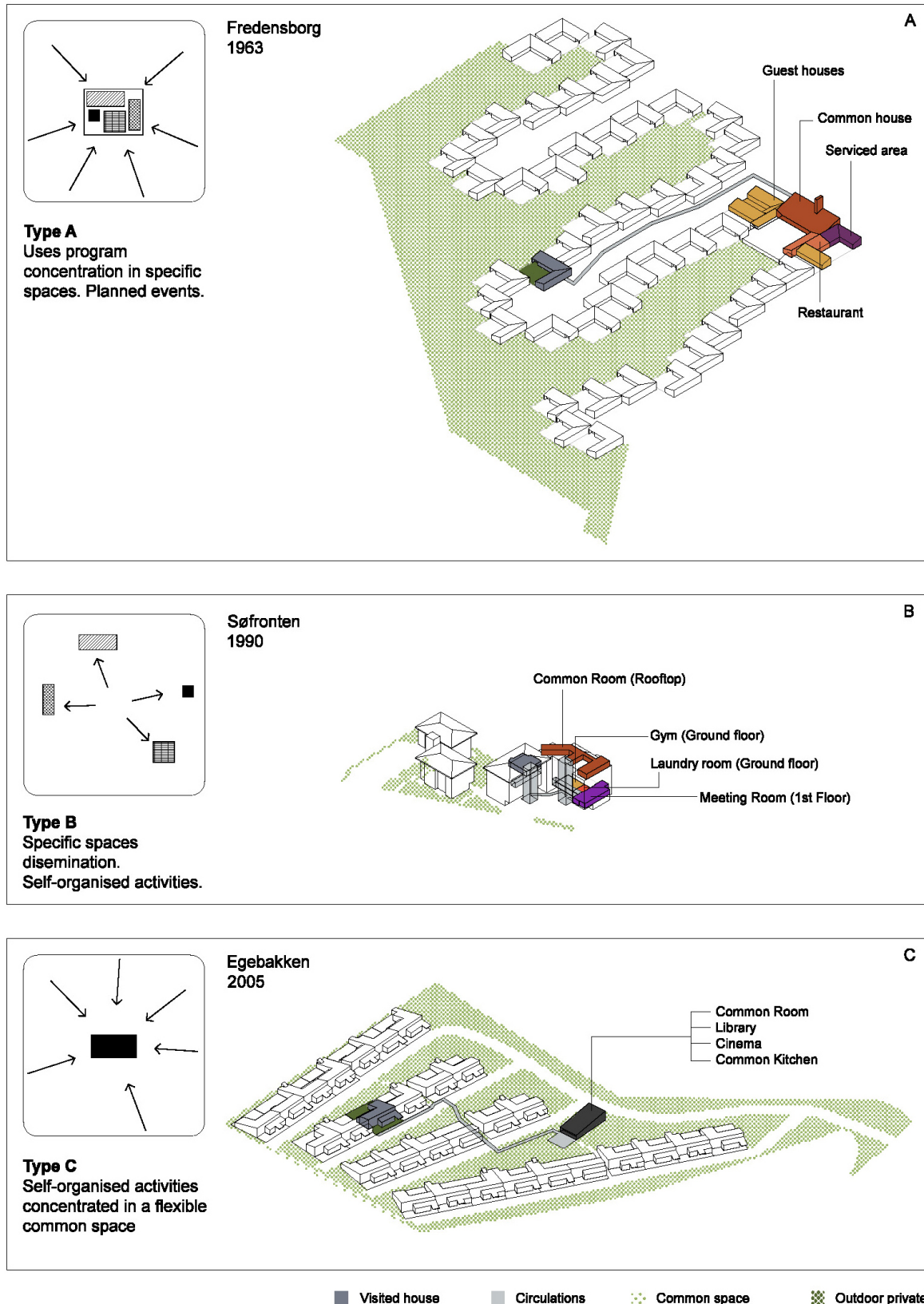
In the examples where services are provided, the importance of social interaction reveals the need to establish a social network in an unknown environment. Therefore, facilities and activities have a significant role. From a functional perspective, these examples have specific spaces clearly defined for each use, thus all events have to be planned and placed in the correct space. This means a larger surface of common spaces specifically designed (Type A in Figure 9, illustrated by Fredensborg example). Since the 1990s there has been a global trend on including some kind of facilities but only for resident's use and management. Therefore, there are no external services provided, and all the activities are self-organised. As far as the programmatic organization is concerned, this still means specific spaces but scattered among the building complex to promote social interaction (Type B in Figure 9, illustrated by Søfronten). Furthermore, this active approach includes, in some cases, the promotion of the housing development conducted by the users.¹³ In these cases, the social network is already very strong, so the space required for activities has to be flexible rather than large. Common space must be able to contain a wide range of different self-organized events; therefore is characterized by a neutral and non-specific definition (Type C in Figure 9, illustrated by Egebakken). The analysis shows users' interest on participating and taking part of their life decisions, thus design process, stressing the importance of merging UD with experience and practice from the complex individuals' reality. As Lid highlights, "UD is defined in CRPD by use of the term usability, which is a subjective term. If design is to be

12 There is a clear relation between the hotel-like examples and the original models of collective housing developed in the beginning of the 20th century (Vestbro, 2010). The main idea behind these collective models was the provision of services to enhance the "new modern user" life quality, especially women, due to their incorporation to the labour market. As a normal consequence, this idea of an environment that permits a high rate of independency but at the same time includes social activities, was easily adapted to the elderly housing needs.

13 This model can be illustrated with Co-housing examples, which are characterised for a common self-promotion, the focus on public spaces for common and participatory activities, and at the same time a clear limit in between the private and the public space.

usable by all people to the greatest extent possible, there is a need for knowledge from a diverse number of individual perspectives” (Lid, 2003).

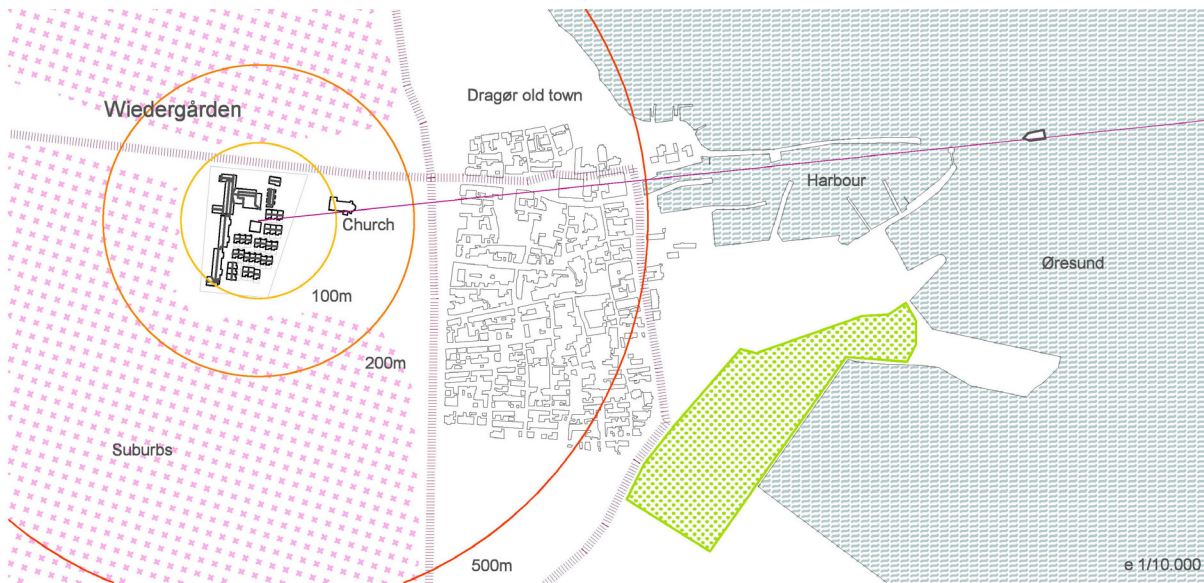
Figure 9
Isometric drawings of selected examples illustrating the three types of common areas design strategies and their evolution on promoting social interaction.



Integration

Integration has a wider scale approach, from the urban context to the different housing units. It is important to highlight the risk of social exclusion linked to urban proposals, based on two premises: because social segregation and as a consequence of singling out the housing development. As mainstream-housing provision is based on the standard family, any different model can be considered “secondary housing” (Hanson, 2001). As part of the compensatory models, many examples have an inter-generational focus to avoid social segregation, but the design approach continues to differentiate between “special needs” home and “normal” home. Consequently, in the specialized models for the elderly, the main focus is on providing a range of different housing types to fulfil the different needs of each person. Goldsmith (1997) defined this approach as the micro-environmental paradigm. In the examples studied, the average home size goes from one to three bedrooms, and normally it is based on the same architectural type, so the differences are related to the size and addition of space. In the self-promoted examples and as a consequence of the development process, it gives rise to a large number of different housing types based, again, on specificity. In these cases, it is interesting to see how the architect’s solution to multiple requests, based on a participative design process, can become a catalogue of specific solutions. Still, it is clearly related to the specialization process of design, complicating an equitable use for the next residents’ generation.

It is also important to stress the social relation with the urban context and the architectural appearance. Many housing models for the elderly are characterised by an institutional appearance as a legacy from institutions. In addition, some housing projects were singled out, creating a social differentiation as a consequence of the professional differentiation among architects, where in recent years, architecture had to be more unique and popular in the media. This social stigmatisation was, in contrast, difficult to find in any of the examples studied in Denmark. From an urban and historic perspective, special focus on the relation with the environment is the main reason for these examples to be considered representative of housing developments. Wiedergården illustrates how respect and knowledge about the context, added to good design, enhance housing qualities by avoiding social differentiation and segregation (Figure 10). These examples show the importance of socio-cultural specificities in relation to architectural design. Besides, they stress the importance of good design as a cultural and also a market value; showing to designers, architects, private and public sector their responsibility on its correct development.



Wiedergården



Dragør

Identity

Identity is a fundamental aspect on the definition of home and relates to physical aspects as well as domestic activities and routines. Rowles, like Rubinstein and Parmelee, states that the relation between person and home is linked to identity and sense of belonging (Rowles, 1978; Rubinstein and Parmelee, 1992). Besides the understanding of home as a container of personal experiences and memories, the sense of belonging is what defines our home and links with the sense of continuity. Compensatory models focus on promoting continuity by designing accessible spaces. As mentioned before, this accessibility approach is more linked to independence than to identity, but it turned out as an important subject when the housing models and policies focused on providing external services separated from the home environment. To allow people age at home as long as possible, continuity has to be guaranteed. From this perspective, there is a strong relation not only with the physical aspects of architectural design but also with use of space or the activities per-

Figure 10

Wiedergården: example of social and urban integration. The location close to old town and local facilities supports social interaction, avoiding segregation. In this case, local conditions were included in the design process, like the attempt to maintain the existing factory chimney, which helped the ships to enter the harbour by its alignment with the church tower. Finally, due to severe structural problems, it was not possible to maintain that chimney, but as an anecdote shows the compromise of the architects with the local urban context (top drawing). At the same time, the materials and scale of the proposal assured continuity by recreating a familiar environment for local residents (bottom pictures comparison).

formed in the domestic environment, including social network relations and daily routines. Rowles uses the concept “choreography of being-in-place” for describing these activities (Rowles, 2000). In this regard, architectural design can support continuity by focusing on these activities, not only with adjustments on the physical aspects but also in the use of the space. Again usability emerges as an important subject for a successful ageing.

Identity is also associated with our capacity to transform the environment, to appropriate of the space. These actions reflect our identity. In the research conducted here, actions performed by the users were tracked in order to highlight its relation with the space. There is a special concern about the boundaries between the private and the common space as representative places for colonization and customization. Hertzberger (2009) gave a special status to these “In-Between” spaces, including good examples in some of his projects for housing the elderly.¹⁴ The users transform the vertical and horizontal outdoor surfaces bordering the private homes mainly with personal objects used for daily routines. The characteristics of these objects and their function reflect person identity (Figure 11). This personalized use of the common spaces means a better maintenance and reinforces the social interaction. Instead of a generic common space that belongs to nobody, it turns into a specific spot in a common space with a semi-private use. On the other hand, as Regnier defends, customization of the private outdoor limit strengthens recognition and self-identification, highlighting a useful strategy for reducing memory and mental illnesses like dementia (Regnier, 2002).

14 The examples are: De Drie Hoven (from 1975) and De Overloop (from 1984) in The Netherlands.



Finally, it is also significant to highlight the importance of common identity within the housing development. As in any other social group, identity reinforces the community and the social network because of the sense of belonging. In some of the examples studied, like the self-promoted ones, this aspect was elementary and totally developed after years of working together on promoting the project. In these cases, this means specific requests for being part of the community as well as previous contacts to have the approval of the members. This situation reflects the importance of the shared activities as a characteristic of their identity.

To summarise, the examples studied show how architectural design for the elderly has focused on the enhancement of personal ageing stages by a compensatory approach. And in general, designers have focused on private living, common facilities and shared activities under a very spe-

Figure 11
Among all examples studied, there are two categories on In-between spaces related to the access type: through a gallery or directly from street. The selected example, Strandlund, shows an interesting combination of both types and its spatial wealth. The dimensions of the elevated gallery support different uses beneath the structure, allowing different ways of individuals' colonization (top drawing and bottom pictures comparison).

cific perspective. Thus, UD constitutes an important tool for designers because of its focus on usability (directly linked with the enhancement of individual independency and interaction) as well as its inclusiveness (facilitating integration by celebrating the differences instead of focusing on individualities). Overall, identity plays an important role for the enhancement of previous elements, giving responsibility to individual participation.

Conclusion

Architectural examples are linked to different ranges of facilities in relation to the services provided; this tendency has defined former and present projects creating very specific solutions. Understanding the challenge under this (micro)compensatory approach only generates social segregation by focusing on the personal differences that have to be compensated for. Mainstream housing models should incorporate an inclusive perspective on design. In comparison, compensatory models must specialize only when the health-care services have to be continuous and specific. Future solutions must have a wider and more sustainable approach in order to maintain the current high-level of services by avoiding future generations to deal with the economic burden of a bad-designed present. This means that design has to be flexible enough to adapt to continuous changes in order to minimize risks, thus expenses.

The aim is to *design for change* making the compensatory approach redundant. Change has to be understood as the standard life condition.¹⁵ Architectural design should focus on human lifespan progress to allow us to live at our own home, even if we have some kind of temporal or permanent disability due to ageing. From this perspective, UD can compete with the actual compensatory approach due to its foresight focus on expanding users' capability by concentrating on usability and inclusiveness.

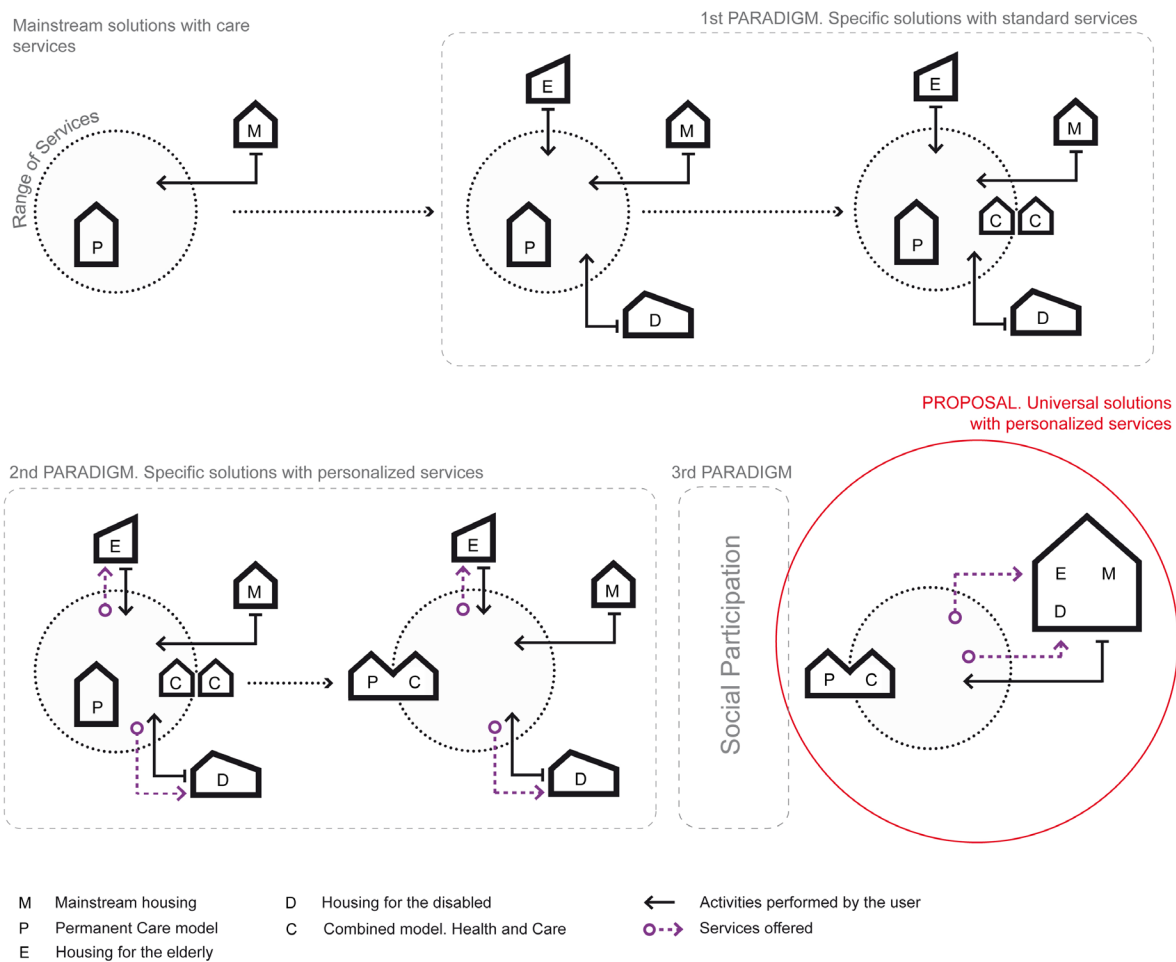
On the other hand, the micro approach focus on the home environment scale has been surpassed in the last 10–15 years with initiatives like Global Age-friendly Cities (WHO, 2007), which include a macro approach for improving ageing in an urban environment. Therefore, another important goal of the implementation of UD lies in its capacity to contribute with solutions for the micro, meso and macro approaches on the whole design process. This multi-scale strategy has also been addressed by authors like Inger Marie Lid from a more generic perspective; Lid include urban and architecture design but also concept of human, legislation and social justice in a macro level, technical standards in a meso level and individual experience in the micro level (Lid, 2013).

15 If we calculate the amount of time were our environment-interaction is limited (as kids, because an accident or due to ageing factors), we can be considered disabled at least 40 % of our lifetime (Aragall, 1999).

In a few years, elderly people will be the largest social-minority in developed countries; therefore, the use of UD will develop in mainstream solutions. With the increasing interest of the housing market in the elderly, there is a great opportunity for integrate UD on the construction process. This will benefit other disabled (or not) minorities, improving generational equality and eliminating the expenses of future functional adaptations.

These three premises highlight the necessity of strategic universal solutions with specialization only on the services required, as a logic continuation of the process developed on housing needs for the elderly (Figure 12).

Figure 12
Proposal Diagram of the different models and services in the evolution of housing needs for the elderly. In addition to the three first paradigms that illustrate design evolution on housing needs for the elderly, a new paradigm linked to UD and Active Ageing is proposed. It is based on the idea of universal solutions, understood as inclusive and usable by all people including those without impairments, and including users on the design process. Thus, leaving the personalized demands to the services required under a person centred approach



Finally, besides UD capacity to enhance independency and socialisation within domestic space, it is important to highlight the necessity of focusing design on identity. UD applied in architecture cannot approach ageing challenges in the contexts of former times. As Active Ageing, it has to include users' participation in the process. As mentioned before, some models incorporate strong user participation, but the architectural solutions are still under a functionalistic perspective. A constructive approach to the challenge includes users on the appropriation and manipulation of the space, this means flexibility in the physical space enhancing adaptability to the different activities. Thus, flexibility is understood as the capacity of the space for been transformed among the use, not only in its physical dimension. If UD is based on usability, from the architectural perspective it has to focus on the use of the space, the daily activities that attached us to the place and contribute to our identity. The aim as architects is to provide a Potential Space.

[...] It is important to consider that the inhabitant performs a job after you. It is a question of where to stop, where to finish the project, how much freedom you give the inhabitant. The space should not impose a particular way of life. You don't have to conceive about everything; you just must give him or her the potential space to be used and appropriated (Lacaton and Vassal, 2015).

Without neglecting functionalism, it is necessary to expand the limits of the relation between the function and the space: less limited activities in a less constrained space enhances users' performance, giving a basic platform based on equality with a high potential on individual participation and personal customization. This means Universal Design integrated in architecture.

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