Designing for Multigenerational Community: Creating a Supportive Environment for Young and Old in the U.S.A.

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DESIGNING FOR MULTIGENERATIONAL COMMUNITY:
CREATING A SUPPORTIVE ENVIRONMENT
FOR YOUNG AND OLD IN THE U.S.A.

Master of Science in Architecture + Health
Thesis

by Tatiana Epimakhova
“...mix of generations makes the community a place to spend one’s whole life, from cradle to coffin, and not just a place to park for a few years.”

(Richard Jackson, 2012)
ABSTRACT

It is well-known that many countries face tremendous challenges triggered by the aging of their population. The increasing percentage of the population that is reaching or at retirement age and rising life expectancy have brought about increasing multigenerativity, a new social phenomenon, when different generations live at the same time longer (Höpflinger, F., 2008). These demographic changes will be complemented with socio-cultural transformations, such as changing the perception of old age, the decrease in traditional multigenerational extended families living together and the growing conditions of multi-locational families. These undergoing changes significantly impact all niches of society: labor markets and social policy, healthcare systems, as well as design and urban planning. So, a crucial question today is how are young and old generations going to coexist in times of scarcity resources and an increasing imbalance between the number of elderly and the number of people in generations below them.

A constantly growing body of available models for housing and delivering healthcare and supportive services to the elderly are based primarily on an age-segregative approach (such as skilled nursing home, assisted living, a retirement
community, board and care housing, etc.). As a result, existing living environments represent mostly a homogeneous milieu, where the elderly are physically and socially isolated from the rest of the community (Peace, S. M., 2001, p.195).

This thesis proposes to explore planning and design strategies that create an inclusive environment for the elderly, supporting “aging in place” whereas, mixed-age (or age-integrated) strategies are targeted for the physical integration of various generations for mutual support and self-help. The mixed-age approach is embodied in a model of a multigenerational community, a residential arrangement for young and old. This thesis claims that a multigenerational community could be a viable alternative solution to traditional age-specific care housing and care models or isolated living in a private house.

The aim of this research is to define design strategies as tools for creating a community for old and young generations in the U.S, and apply them through the development of a conceptual project. Seven imperative guidelines were developed based on a literature review and analysis of the best design practices of multigenerational communities in the U.S. and Europe. These design strategies were applied to a conceptual design of a multigenerational community in Greenville South Carolina. The
project presents a unique symbiosis of healthcare, residential and mixed-use environment, suitable for every stage of life. It includes an ambulatory clinic that serves all ages, a community café, co-working space, a day-care and other communal facilities that form essential features of this community together with contiguous outside spaces that create beneficial and supportive milieu for everyone.
DEDICATION

In loving memory of my grandparents:
Rafail and Galina,
Yuriy and Albina.
ACKNOWLEDGMENTS

To my advisor, David Allison, for being to me a sure support during these two years spent on the opposite side of the world from home, for inspiration and trust, for showing me that healthcare design is not a boring thing to do, but rather a fascinating and captivating art.

To the American Institute of Architects Academy of Architecture for Health for granting me the AIA Arthur N. Tuttle Jr. Graduate Fellowship in Health Facility Planning and Design to assist my adventure in winter Europe and in the U.S.

To my committee members, thanks to each of you for being for me bright examples of intelligent, sophisticated professionals, and beautiful and kind women. Thank you for your patience and support!

To Senator J. William Fulbright for fulfilling my old dream of having friends around the world.

To my parents: Evgeniy and Nataliya, and to Kasper for your faith in me, love, and being with me across the Ocean! I miss you so much!
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INTRODUCTION

Housing for the “silver” clients is a popular topic for design and architectural planning today. The common approach today is focused on designing for the elderly people instead of designing for them as people. Everyday social media insistently introduces to us the image of “normal” person as young and healthy. However, socio-cultural changes related to the demographic aging of global society have been forcing change in existing approaches to the design of senior living as an exclusive case for planning to more a comprehensive, integrative approach for everyone.

It is expected by 2030 in the U.S.A. one out of every five people will be 65 years old and over ( Ortman, J. M., et al., 2014, West, L. A., et al., 2014). Also, life expectancy is increasing remarkably: between 1950 and 2013, life expectancy at birth increased more than 10 years (National Center, 2014). So, because of these demographic changes, the elderly are becoming an important normal target group for design. Their growing longevity has brought a new phenomenon of multigenerativity to American society, a time when young and old generations live together longer than ever before (figure 2) ( Höpflinger, F., 2008). These socio-demographic developments significantly influence on the healthcare system, the labor market, and social policy. In healthcare will be a

Figure 2. Multigenerativity, a new social phenomenon when different generations live together longer
shift from acute care to the treatment of chronic diseases. The demand for caregivers specialized in long-term care will be increasing. In addition to that, there will be a need of additional financing sources for healthcare services since public and private expenditures are growing along with the increasing number of beneficiaries. In the labor market it will be crucial issue of increasing labor productivity because of a sharply growing number of labor force nonparticipants. In the social sphere it will require both social security and pension reform and the development of additional social services to support older adults. Therefore, one of the question for this thesis is “How can different generations live together?”

The existing car-dependent and dispersed environment in the U.S.A physically segregates older adults from the rest of the society. At the same time, decreasing cognitive and physical competences of many elderly as they age often diminishes their life space to the four walls in their home and turns them into “prisoners of space” (figure 3) (Rowles, G. D., 1978). So, another question is: “How to extend the life space of older adults and integrate them into the rest of community?” This thesis explores the issues and design challenges for creating multigenerational community, an environment designed for all ages, as a possible alternative to age-specific solutions for the aging
population in the U.S.A. Also, the author states that a multigenerational community is a mutually supportive and beneficial environment for all ages.

The purpose of this thesis investigation is to identify design strategies that create a supportive environment for all ages and demonstrate their application in a conceptual design proposal for a small American city.

The initial phase of this thesis involved review of socio-cultural changes of aging American society and an assessment of the existing built environment for the elderly (Chapter 1). Traditional and modern patterns of multigenerational living were investigated. A comparative review of multigenerational living and traditional age-segregated models is then provided (Chapter 2). Based on a literature review, there were found six objective in the built environment critical for designing a multigenerational community. The detailed information about these objectives is framed in chapter 3. To achieve the formulated objectives, a series of design strategies were developed based on a literature review, best practice case studies and site visits to the existing multigenerational communities in the U.S. and in several European countries recognized for innovative and viable approaches to age integrated housing and services. The proposed design strategies were tested in a conceptual design proposal for a multigenerational community in Greenville South Carolina.
1. **A “NEW” OLD AGE**

1.1 **A NEW DEMOGRAPHIC SITUATION**

The distortion of the age balance in American society has led to the fact that accommodating the elderly is not an exceptional case for planning and design as it was before. Until the late 20th century, only a small percentage of people could reach old age, and when they did, it was more likely that they were part of extended families living together or in close proximity.

However, the modern situation has changed tremendously. It is expected, by 2030 in the U.S.A. one out of every five people will be 65 years old and over (Ortman, J. M., et al., 2014, West, L. A., et al., 2014). Younger working generations are becoming a demographic minority and at the same time, the number of seniors is steadily increasing. Moreover, modern lifestyles, triggered by increasing labor mobility, are one of the reasons for the appearance of multi-local families, which means the traditional multigenerational households are increasingly rare today. Therefore, senior care is shifting from family-based to a responsibility of all society. Nowadays in the U.S., the economic burden for retirement is on government programs such as Social Security and Medicare for low and moderate income retirees, and/or on private financial
mechanisms if individuals have invested in their retirement period during their work life. The people who are not able to afford to save or invest for their retirement, must rely solely on social security and Medicare. It means that fewer younger people are financially supporting through tax obligation a growing number of older people.

Consequently, today there is a growing demand for new models of living and care for seniors with a shift toward to more economically sustainable, community-oriented schema, where the collaboration and mutual support between residents could ease the economic and social burden for society. Another issue is that the increasing number of elderly calls for expanding the number of professional care services and addressing the shortage of caregivers. This also leads to raising the load on the existing infrastructure (particularly, public transport network, accessible daily services, and public facilities) and expansion of it, which will have a significant impact on the entire economic situation in the U.S.A. In general, the development of elderly care has a cyclic character in the history of healthcare: from family care, through government-operated institutions (supported by Social Security and Medicare programs, and institutionalized environments) to again residential and community-based innovative models, the “normal” home environment with emphasize on building of a community
with mutual support among residents.

Current architectural planning and design interventions are primarily targeted at a healthy young population and their physical and cognitive abilities to use the built environment. Usually when people age, they adapt their homes by themselves, because their physical environment (including our buildings, furniture, and equipment) is not accessible, or ergonomically suitable for less able-bodied adults or growing children (figure 5-6). It is also critical to minimize the possibility of safety hazard in design, for example, thresholds should be removed, floor and walls have to be painted in contrasting colors, floor finishes should be slip resistant and etc. Cities and towns should be designed for easy and pleasant walking and bicycling rather than driving. However, the advocates of old-age suitable design point to the importance of design that is suitable for all ages, for everyone despite their individual physical capabilities and performance (Bohn, F., 2008). Physically healthy people also suffer from obstacles and limits in the built environment such as inconvenient passage ways, dim street lighting, physically unreachable furniture and so on. It is crucial to understand today that a completely healthy and able-bodied person is not insured against an accident and tomorrow he or she could become disabled and in need of an accessible and safe environment.
environment. That is why “construction design suitable for the elderly and disabled” means “construction design suitable for life” (Bohn, F., 2008, p.184).

To sum up, demographic changes call for the design of alternative and innovative solutions in housing and supportive settings for the elderly where they are physically and socially integrated and are able to live independently.
1.2 SOCIO-CULTURAL CHANGES

The period of old age is becoming a significant time in a person’s life, which lasts longer than it has ever been before. Between 1950 and 2013, life expectancy at birth increased more than 10 years (National Center, 2014). This makes retirement not a short episode before death but a chapter of life, which lasts longer than other phases of life: childhood, youth, and adulthood. Retirement is a period of opportunities with reduced obligations to family or society. So, the perception of Old age has changed today. British historian and sociologist Peter Laslett divides the life circle into four stages: the 1st Age or childhood, a period of “dependence, socialization, immaturity and education”, the 2nd Age (adulthood) is “era of independence, maturity, and responsibility, of earning and of saving”, the 3rd Age is a time “of personal achievement and fulfilment” and the 4th Age “an era of final dependence” (Laslett, P., 1991). By distinguishing the 3rd Age as a separate phase of life he indicates the complexity of a “new” old age.

Today the elderly look different than in previous decades (Schenk, H. 2008). F. Höpflinger, professor of sociology at the University of Zurich, terms these circumstances “Generational changes” (Höpflinger, F., 2008, p.33). More people in modern old age reach retirement in better health conditions and look good and fashionable because of

Figure 7. Modern “third agers” are in better health form than their parents and grandparents
advances in medicine, cosmetics, and healthcare (figure 7). In a period of globalization, the elderly are more open to changes and innovations. Another point is that the elderly today are more independent and self-confident than previous generations, they advocate their wishes and preferences. Evidence of this trend is a constantly growing number of self-organized projects associated with senior living. Self-organized housing developments are those which are initiated privately, by the future residents themselves because they prefer to arrange their living settings according to their specific needs and preferences (Huber, A., et al., 2008). One of the successful examples of self-organized housing is “Wohnfabrik Solinsieme” in Saint Gall, Switzerland was started by four enthusiastic women in their late 50s (figure 8). After retirement, each of them found herself living in a spatial apartment alone because her adult children had established their own families and had moved out. So, these women decided to build a more attractive and functional alternative solution. They found architects, solved the financial issue of the project, and after one year of planning the construction has been started (Huber, A., et al., 2008). In the U.S., self-originated projects are often associated with the establishment of co-housing communities. For example, “Cambridge Cohousing” and “Cornerstone Village” in Cambridge MA, were developed by a small number of
However, modern older adults are not a homogeneous cohort (Höpflinger, F., 2008, p. 32; Schenk, H. 2008, p. 18). Their longevity generates a greater differentiation between older adults. Different people are aging in different ways, depending on lifestyles over their lives. Diverse educational and social backgrounds also shape a pluralistic character of old age. Therefore, the universal existing cliché about an old person as a fragile and dependent member of the society is not applicable anymore. The major task for architecture and urban planning today is to provide a diversity of housing options, care models, and services that can better meet the varied and changing needs of people as they age.

To conclude, current socio-demographic changes call for a search for new, different non-traditional forms of senior living. It is important to properly investigate community-based residential forms of living and care. Although the need for special acute elderly care will still be in demand, there will be an increasing need to optimize the number of people who can age in place as long as possible. The silver housing market should provide a diversity of available options, designed to meet the needs of different clients. First, it is critical to provide an assessment of the present situation in elderly care and living arrangements in the U.S.
1.3 EVALUATION OF EXISTING BUILT ENVIRONMENTS FOR THE ELDERLY

“Life space” defines a socio-physical milieu where individuals inhabitant (figure 10). The concept of life space covers a physically determined area with services, located at an accessible distance, the physical resources within a given place and one’s social environment. (Cantor, M. H., 1979). The physical environment, where a person dwells, could be a street, a neighborhood, a part of the city and etc. By physical resources of a place, Cantor, M.H. means facilities and services used by an individual in his or her daily life, such as a grocery store, pharmacy, theatre, clinic and etc. A social component of a person’s life space consists of his or her family, friends, neighbors, co-workers, colleagues and, community.

Aging is usually accompanied with serious changes in a person’s social life, such the loss or interruption of contacts with former colleagues, friends, a separation from adult children as they move out and away, a death of a spouse, and the establishment new social roles (a grandparent, a retiree). The loss of social contacts is one dimension of a diminishing of life space. Meanwhile, the decline in physical and cognitive health of the elderly can also trigger contraction of the physical area of life space. Physical limitations, for example, rheumatoid arthritis or hip replacement, could limit the
accessible physical environment of an older adult to his or her apartment or even less such as a kitchen, bedroom, and a bathroom. Any type of sensory loss, for instance, vision, also could remarkably restrain a life space of person and deprive the ability to walk or drive a car, and with that his or her independence and self-confidence. These circumstances can cause older adults to spend the majority of their time at home. Older adults “on average [spend] two-thirds of their waking time within their own four walls” (qtd. in Bohn, F. 2008) (figure 11). Access to services available in an older adult’s surrounding, those that support the daily needs of the elderly, is critical for keeping the same physical and social dimensions of life space while aging in place. A possibility of shopping, sitting in cafe, or to entertain is important for staying independent with an essential ability to make your own choice. That’s why the ability of the built environment to be able to support changes related to aging in an individual’s life is crucial for preventing social and physical segregation, isolating seniors from the rest of society, and maintaining their independence.

The model of “Environmental Press“ developed by M.P. Lawton illustrates the relationship between the built environment and the competence of an individual (Satariano, W., 2006) (figure 12). As the physical and cognitive competence of the

Figure 11. The older adults “on average [spend] two-thirds of their waking time within their own four walls” (qtd. in Bohn, F. 2008)
elderly declines supports from the built environment become more important. For example, a “self-evident to use” environment with clear wayfinding assists a person disorder to orient in space (Marg, V., 2014). The gap between a person’s competence and the supports available in the built environment can contribute to a loss of independence and autonomy of older adults (Pastalan, L.A, et al., 1986).
In the U.S., the car reliant environment does not only increase obesity, limit physical activity and access to healthy food, and aggravate chronic diseases, but it also promotes social isolation and loneliness in the epoch of an Internet-based life. As R. Jackson states (2012, p. 10), the car-oriented built environment in the U.S., where homes are separated from workplaces, schools, and other educational institutions are detached from the rest of the city, limits the possibility to explore the city for children, as well as socializing opportunities for seniors and people with physical or cognitive limitations. When someone either does not have, or loses, the ability to drive a car, they become physically and socially isolated in a dispersed suburban landscape. In other words, such a dispersed structure breaks down a natural “mosaic of interrelationships” (Hertzberger, H., 1991, p. 79), where a mixed, diverse milieu of different inhabitants coexist and collaborate with each other as it was in traditional neighborhoods.

In the spring of 2015 an online survey was conducted by the author among OLLI (Osher Lifelong Learning Institute) members at Clemson University, Clemson SC and OLLI members at Furman University, Greenville SC to get an assessment of existing built environment for the elderly in the U.S. The main areas of dissatisfaction among all informants were: links to public transportations, lighting levels in their neighborhood,
accessibility to infrastructure and noise levels. Three out of four problems (links to public transportation, accessibility to infrastructure and noise level) are caused by breaking up the cohesion and connectivity of the living environment when designed exclusively for cars.
CONCLUSIONS

As a person ages, the supports available in the built environment and existence of accessible services and activities should complement the decline in the physical and cognitive competence of individuals as they age. Appropriate settings and access to supportive services in the built environment could support the elderly for aging in place and facilitate the optimization of their life space. Moreover, the opportunity to participate in a diverse range of activities and events within their physical context helps seniors to stay active and be independent longer. Optimizing opportunities for collaboration and communication between residents in a community can be a significant source of support for the elderly that can help compensate for the decline in the abilities and competence of seniors.
2. ARCHITECTURE AND URBAN DESIGN IN SUPPORT OF INTERGENERATIONAL PATTERNS OF LIVING

2.1 A MIXED-AGE APPROACH IS AN ESSENTIAL ATTRIBUTE OF A HEALTHY COMMUNITY

An essential feature of a healthy environment is a strong sense of community and collaboration between residents. A living environment, one that is socially cohesive and integrated, provides a supportive setting for everyone. Opportunities for mutual support and collaboration between residents of all generations in a community is a key factor for viability and sustainable growth in any community. A number of theorists in architecture advocate for a heterogeneous social milieu in a community, which calls for an important presence of all ages.

C. Alexander asserts the idea of balance in a community of all life stages, where each age has its own unique experience and by contributing to the larger community composes the holistic picture of life cycles. To provide an age balance in planning community it is necessary to establish supportive settings for each age stage. “Make certain that the full cycle of life is represented and balanced in each community.” (Alexander, C., et al., 1977, p.145).
The psychological drive to be able to see and interact with other generations is an intrinsic need for everyone. “Children need the elderly, and as anyone who has visited an elder care facility knows, elders need children around” (Jackson, R., 2012, p. 7). Our cities are designed mainly for healthy adults, whereas the elderly and children are two often overlooked and underprivileged groups. Therefore, multigenerational settings are especially important for supporting healthy childhood development and aging in place. “… social and functional mix of heterogeneous urban neighborhood is an ideal context in which this [involvement of younger generations] can arise. And it is also an indispensable instrument that allows people to still “make music” as they grow older” (Hoffman-Axthelm, D., 2014, p. 140).

An innovative model for the aging population and multigenerational living has been developed under a broader sense of “Integrated living”. The concept of Integrated living has a wide scope and means that the environment is designed for different groups of residents with specific needs: people with disabilities, the elderly, immigrants, single parents, teenagers and etc. (Ebner, P., et al., 2007, p. 12). By integrating diverse inhabitants with their specific needs, such an environment fosters a sense of community and mutual support between residents. Besides social engagement and
communication, a project designed under the concept of Integrated living can be a more affordable solution because institutional care and others services could be replaced by support from residents among themselves. An “Integrated Living Model” in Kempten, Germany is a home for the disabled, single parents, families and students (figure 13). One of the features that make this housing beneficial for everyone is integration to the city infrastructure and vicinity to city center, so the tenants can easily participate in cultural events in Kempten (from observation). There is no integrated services in the complex, however, the popular place for community meetings is Cafe Etwas. The group of residents formed a board to help govern themselves and run the facility. Originally, it was designed to include 64 apartments, among them 6 units for handicapped people, along with shared apartments for students (Huber, A., et al., 2008, p.116). Later, 2 living units were united and transformed to a cognitive behavior therapy unit for people who suffer from any type of dementia (for residents and non-residents) (from observation and conversation with residents). In this community the students usually go to grocery store for the elderly (from the conversation with residents of this community).

Another example is a program where young parents invite retired people to baby sit by paying a symbolic fee for their favor. This service is sometimes called “Rent
However, besides babysitting, the dominant elderly population, which tends to be women, might be engaged in any type of domestic tasks such as cooking, pet sitting, housekeeping and etc.

The core premise behind multigenerational living lies in the idea that custodial institutional care in such facilities like a nursing home, or a retirement community is financially unsustainable and anonymous (Huber, A., et al., 2007, p. 100, Krings-Heckemeier, M-T, 2009, Hoffman-Axthelm, D., 2014, p.141) (figure 14). In institutional elderly care facilities, there is a high turnover rate in staff because of the emotionally and physically difficult character of work. Meanwhile, in community-based residential settings the care could come from neighbors and friends instead of unfamiliar an ever-rotating and potentially impersonal staff. A multigenerational environment encourages the elderly to be more independent and stay active longer because in settings without hired staff the elderly are more inclined to rely on themselves and at the same time it helps them feel safer because they can count on help from their neighbors. In addition, self-help and mutual support among residents is a more affordable solution than nursing care. The social sustainability of an entire society, especially in an era of ever diminishing public funding and support depends on an ability of old and young.
generations to collaborate and assist each other (Black, S., 2014, p. 103).

Physical segregation of generations from each other has the potential to aggravate the tension between generations caused by the impact of limited social resources, like healthcare services or employment. Also, the increasing economic burden of supporting existing health and social service models will be placed on an increasingly smaller percentage of young people. In this way the growing proportion of retired people has the potential to increase the tension between young and old generations (Schenk, H., 2008). This is also one of the reasons that makes multigenerational living a subject of increasing interest in sociology and architecture.

Various models of multigenerational living are also beginning to receive significant attention in the U.S.A. In addition to the advantages of multigenerational settings for the elderly, there is a need for available, affordable and quality child care, especially for low and moderate income families and single parents. One of the residents in a multigenerational co-housing community “Cornerstone Village” in Cambridge, MA explained why she and her son prefer to live in the mixed-age community: “We took an idea of “cohousing” from Denmark to avoid isolation and fostering kids. Historically, everyone has lived together.” Usually, in multigenerational cohousing communities,
duties such as cooking, cleaning or caring for children are shared among residents, which clearly ease the life of residents of socially disadvantaged categories (single parents, elderly or people with disabilities). The sharing of responsibilities also encourages social interaction between residents and assists in establishing new social contacts.

It is interesting to note, that this model has been developed in some European countries for a long time. For example, in Germany the model “Living spaces for young and old” was originated by a non-profit company the St. Anna-Hilfe gGmbH in the 1990s and the first community based on this philosophy was built in 1995. The main principle of this model is an access to infrastructure, so everyone despite of his or her physical abilities has access to essential services such as a physician, grocery store, and church. This idea helps to maximize independence and self-help among the elderly (Huber, A., et al., 2008). A housing development “Am Bahnhof” in the small German city of Meckenbeuren is based on this model (figure 15). This housing complex is linked to the train station that provides convenient access to other larger cities closed to Meckenbeuren. Daily essentials like pharmacy and grocery stores are located within walking distance (500 m or 1600 ft) (from observation). Also, there is a common room used for community events and group activities such as memory training, a physiotherapy practice, a playroom for children and offices (Huber, A., et al., 2008).
2.2 HISTORICAL PRECEDENTS OF MULTIGENERATIONAL LIVING

The idea of multigenerational living is not new. The origins of this model are found in traditional housing for three-generational families where mature adult members of a family were responsible for their elderly parents who helped raise the children. All family members lived together under one roof. Also, the patterns of intergenerational living on a bigger scale in many cultural contexts can be found in a traditional village, where spatial and social structures stimulate beneficial coexisting of all generations (figure 16). In a traditional village services and settings supported needs of divergent age groups and were located within walkable distance to a church, a store with local goods, and cultural events usually held on a main street and etc. Moreover, a village is a close-knit community with different level of interaction such as a family, friends, neighbors, the larger community and a strong social bond and commitment to collaboration among all residents.

The non-designed neighborhood which meets the needs of all ages is a phenomenon known as Naturally Occurring Retirement Communities (NORCs). NORCs develop in two ways. Firstly, aging-in-place occurs when people settle in a community when they are young and beginning to raise a family. They remain in their homes...
after their children grow up and move out and away from home. The parents remain for a variety of reasons. They may not be able to afford to move away. They may not want to leave the social network they have established with peers and institutions in the community. They often develop an attachment to the physical familiarity of their homes and communities and the services they use. This is common in rural areas, small towns and some inner city and suburban communities that have not yet experienced gentrification. NORCs also occur when the elder upon retirement move into a neighborhood or community that is not exclusively age segregated for a variety of reasons. They may be downsizing their homes and moving into homes that are more suitable, more accessible and easier to maintain. The neighborhoods may be more walkable and include, or be closer to, supportive services. As an example, Traditional Neighborhood Developments [TNDs] have increasingly become havens for both the more affluent elderly and families of all ages although the ratio of elderly to other generations is often skewed toward the elderly. NORC generally occur naturally when there is access to supportive services that are needed by the elderly including housekeeping, transportation, healthcare services or recreation.

There is a significant body of research about multigenerational living in a history
of architectural theory. For example, in the 1980s, a considerable amount of work was done by Soviet scientists (V. U. Durmanov, V.L. Rugge, B. L. Krundishev, etc.). The research work of V. U. Durmanov “Housing typology for families with older parents” was focused on a search a variety of living models for three-generational families with a different degrees of independence of young and old generations. He identified four major types of apartments for traditional families with older parents to provide them an opportunity to live closer to each other (figure 17). The degree of independence of different generations in a family is increasing from the first type to the forth type. The first type is an affordable apartment with a limited number of rooms, where generations live together. The second type is an apartment with extending zones such as an additional bathroom, closet, or the second entrance. The third type is two adjoining apartments with a common space. The last type with the greatest degree of autonomy consists of two separate apartments, located within the same complex.

Another significant area of inquiry in the theory of architecture is related to accommodating needs of different generations through the adaptability of the space. For example, the project “Fleksible Boliger” designed as the proposal for a competition “Flexible Housing for the Young and Old” by architectural firm “Yegnestuen Volden” in

Figure 17. V.U. Durmanov “Typology of Housing for Families with Older parents”. Source: Durmanov, V. U., 1978
1986 in Denmark accommodates a variety of user groups (figure 18). The space with a circulation core could be one single apartment with 4 rooms, 2 bathrooms and kitchen or could be separated by partition wall into two independent units. So, two units could be occupied by a young family and the elderly couple, it could be one single apartment for a large family, or it could be a communal apartment for 4 adults and other possible variations (Schneider, T., et al., 2007, p. 98).

While generations in modern families choose to live independently and separately from each other, sociologists mark the relationship between older grandparents, their adult children and grandchildren as more positive and emotionally closer than in the previous generations. “Intimacy at a distance and lifelong solidarity” is the main motto for generations in contemporary families (Schenk, H., 2008, p. 19). This fact indicates the growing presence of multilocational multigenerational families, when generations in one family live in separate households and independently but maintain warm relationships within an extended family (Ebner, P., et al, 2007, p. 15, Höpflinger, F., 2008, p.39).

However, the percentage of multigenerational households still grows slowly in the U.S. The multi-generational families that do exist in the US are mostly related
to economic circumstances (such as incapacity of young people to afford a house, unemployment), the increasing number of immigrants from countries with strong traditions of multigenerational families, and social changes (as late marriages, need in family caregivers) (Lofquist, D. A., 2008). Therefore, the practice of building multigenerational houses is a small but growing a demand in the U.S.

An example of a house for a three-generational family is “Bridge House” where, three separate living spaces are designed for each generation. The older couple occupies a suite on the first floor next to common areas for an entire extended family which includes a kitchen, dining room, and lounge. Their adult son and his wife and two children live on the second level. Here is also located a small suite for a daughter of the older couple, who regularly visits them (“Bridge House”) (figure 19).

The alternative to a three-generational private house is the “granny flat” model or ECHO Housing (Elder Cottage Housing Opportunity) or Accessory Unit, a situation when young and older families (could be non-relatives) live separately in different living units, located on one lot. For example, House Eichgraben in Austria is designed in a way that there are two completely independent living units located on the property: one is for a young family and another for their older mother (figure 20). The granny flat...
with a separate entrance is located below ground and in the future could be converted to a doctor’s practice. This model provides a greater degree of independence for all generations than a traditional three-generational house, and at the same time, it allows them to live close to each other and enables mutual support between the young and old. Sometimes when the owner of the property is an older person, he or she can rent out the second unit. The person who lives in the second unit can help take care of the elderly person and can pay less than usual rent. In another case, the family who lives in the primary living unit might take care of an elderly parent, who lives in a “granny unit”. Meanwhile, the elderly grandparent could take charge for children while their parents are at work.

Germany started a practice of designing multigenerational housing developments in the 1990s. Interest in this model was caused by the rapidly growing older population in Europe and a need for innovative and more financially sustainable solutions for aging. Today, after more than 20 years, a significant number of research studies conducted in architecture are devoted to an assessment of these multigenerational communities. For instance, one of the research institutes that devoted the majority of its projects to this question, is ETH Wohnforum – ETH CASE (Centre for Research on Architecture,
Society & the Built Environment) in Zurich. Their projects are devoted to evaluation of existing multigenerational communities and innovative models for senior living. One of them is “New Approaches to Housing for the 50+ Generations. Innovations on Housing in the Second Half of Life” that describes the results of a post-occupancy evaluation of 13 housing projects in Switzerland and Germany. This publication served to identify for choosing site visits to multigenerational communities in Europe.

One of the earliest multigenerational projects at the scale of a housing development is the Multi-generational House in Stuttgart built in 2001 (figure 21). Apartments for seniors are designed as a communal unit with private bedrooms and bathrooms but shared kitchen and living room. There is also a child care center for 120 children in this housing development to support families with children (Ebner, P., et al., 2007, p. 32 – 35).

A well studied contemporary example of a multigenerational neighborhood is the Italian-American community in Roseto, Pennsylvania, where traditionally young and old live together (figure 22). The study of this community showed that the elderly who were more engaged in social life have been living longer than those who were isolated. Another important characteristic of this community, until recently, is that many older
Rosentans lived with their adult children (Designing healthy communities).

Another model of a multigenerational neighborhood called co-housing was adapted in the U.S. from Denmark and Sweden. Co-housing is based on the historical idea of coexisting all generations together and mutual benefits for them. Co-housing came to the U.S.A. from Scandinavia in the 1990s. Co-housing or collaborative housing was originated in Sweden and Denmark to support families’ tasks such as cleaning, cooking and fostering children as an alternative to a single family home. The concept of co-housing is based on a mutual support, cooperation and sharing work instead of hiring employed staff (Sangregorio, I-L., 2000, p. 6). Cohousing typically consists of 10-15 individual dwellings and one common dwelling for sharing daily activities (Jones et al., 2008, Vestbro, 2014). Cohousing can be oriented to only older people or can be a multigenerational community. One of the U.S examples of multigenerational cohousing is Jamaica Plain Cohousing in Cambridge, MA (figure 23). Jamaica Plain Cohousing consists of 30 private living units (apartments and townhouses) and a common house with a shared kitchen, living and dining rooms, children room, workshops, laundry and etc., arranged around a central courtyard, which is a popular place for social gathering (“Jamaica Plain Cohousing”). Spatially the community is organized in a way to provide

Figure 23. Jamaica Plain Cohousing. Cambridge, MA. U.S.A. 2005
Architect: Kraus-Fitch Architects, Inc.+DHK
social interaction. For example, the people who are arriving at home, are encouraged to enter through a common living room. “We say, that the way from your car to your apartment takes 45min. or 2 beers” (from a conversation with residents). Another example is that the common kitchen is connected to a children’s room, so parents can observe their children while cooking. A resident in “Jamaica Plain” shared her experience of living there: “We like it [co-housing] because it allows us to spread work [cleaning, housekeeping, cooking, or babysitting] ...among people who are both able-bodied, and those less-able-bodied. It helps us to interact with young people and with someone, who is older than us” (from conversation).

Another age-integrated model is a College model (university-based), which could be built on a university campus or in the same community. This is a concept of living and learning, “life-long learning” with an opportunity for the elderly to learn. This integrated model provides the residents housing options along with such beneficial services like maintenance, meals, transportation, housekeeping, healthcare, academic classes, cultural, sport and social event (Dwight, M. B., 2009, p. 27).

A similar model is a life-long learning community when the elderly live in close vicinity to a university campus and use services operated by the university. For example,
Clemson University, South Carolina has the Osher life-long learning community for older adults, who want to be involved in the academic and cultural life of the university. For the U.S. as a country with an enormous number of universities, both these models provide forward-looking possibilities for the future.

Today the beneficial coexisting of different generations is becoming a popular focus for the planning of urban quarters designed for all generations, and is based on the idea that care facilities are not economically and socially sustainable solutions because of a lack of social resources, the rising old-age dependency ratio, and an insufficient network of infrastructure. These urban quarters may be called “living environment for all generations”, “living space for young and old”, “multigenerational community”, “community for all ages”, “all-age communities” (Krings-Heckemeier, M.-T., 2009, Huber, A., et al., 2008). The main principle of these integrated strategies is fostering informal mutual support between generations and increasing the sense of community. Consequently, the importance of the design of urban-scale neighborhoods for all ages will be increasing in the future since the new demographic situation will significantly increase the burden on the existing infrastructure: a network of accessible care facilities and daily services, and the need for an expansion and optimization of
It is crucial today to adapt older cities to the needs of all ages and to build new environments that are accessible for everyone and accommodate the various and collective needs of multiple generations.

Based on literature review and best practice case study review of examples of multigenerational living, co-housing and environments designed to support the elderly, the author conducted nonparticipant observations and site visits to new designed multigenerational communities in the U.S.A, Germany, Switzerland, Austria and two renovated urban quarters in Denmark. It is important to note, that some countries have made a shift from supporting needs of the elderly to a holistic approach to serving all inhabitants. For instance, such a shift was made in the Netherlands, Denmark, and England (Krings-Heckemeier, M.-T., 2009). In Denmark, a belief that older people should live together with young generations is essential. So, that is why specialized housing for seniors hasn’t been built there since 1987 (Krings-Heckemeier, M-T, 2009). The model of the multigenerational neighborhood is the result of the belief that collaborative living between old and young generations an essential condition of life.

Two visited communities in Denmark, “Egebjerggård” in Ballerup and “Gyldenrisparken” in Copenhagen, were adapted to make these neighborhoods tailored...
to all ages (figure 24). In both cases, special facilities for seniors were integrated into the communities with families. This principle helps to involve the elderly physically and socially into existing contexts, which is an important factor that influences the “life space” of the older adults. European professionals in architectural design follow this principle in their work. For example, Edzard Schultz, a partner of architectural firm “Heinle, Wischer und Partner” in Germany believes that physical integration of housing for the elderly into the existing urban context is a significant contributor in an establishment of the social contacts for the seniors (from interview).

Modern multigenerational living could be focused on the needs of specific target groups such as housing for homosexuals, only women or grandparents fostering their grandchildren. For example, a residential model for homosexuals might emerge as a self-initiated project to avoid social exclusion in other types of senior housing (Feddersen, E, et al., 2009, p.139). The communal housing L.A.Rieshuis in Amsterdam, the Netherlands is designed specifically for the elderly homosexuals (figure 25). The housing consists of seven independent living apartments and a common area on the ground floor. For special care the residents can appeal to services delivered from the adjoining nursing home.
The *Beguinage model* is a resident-initiated housing project only for women. The Beguinage movement was started in Germany in 1997. The essential idea of this type of housing is a sense of security, psychological support and solidarity among women (Huber, A., et al., 2008, p. 113). This housing model reflects the reality that older women outnumber older men. The Beeginenhof in Dortmund, Germany is an example of a multigenerational housing model for older women, single mothers and lesbians (figure 26).

Figure 26: The Beeginenhof Dortmund: a communal housing for women. Dortmund, Germany, 2006. Architect: Ralf Műschenborn
CONCLUSIONS

Multigenerational living is not a new phenomenon. Traditional patterns can be found in three-generational households, old neighborhoods (a village or a city street), and naturally occurring retirement communities. Today this model of living has being developed on several planning scales: on the level of an individual house, in housing developments and in urban quarters. Housing for three-generational families and “Granny flats” represent two models of an individual house. Multigenerational housing, such as the Beguinage model and housing for specific groups of the elderly are communities on the level of housing development. Co-housing, university-based, lifelong-learning models and multigenerational neighborhoods are models at the level of an urban quarter or community.

In spite of the fact that multigenerational living has a long history, it is important to define objectives for designing the built environment that make it a supportive milieu for all ages today.
3. KEY OBJECTIVES FOR THE BUILD ENVIRONMENT FOR ALL AGES

3.1 SPATIAL PROGRAM THAT SUPPORTS NEEDS OF ALL AGES

The complexity of multigenerational living involves the search for social, programmatic and built environment solutions that meet the diverse needs of a cross section of individuals and families at different life stages and to helps to avoid conflicting needs between generations.

As C. Alexander states, to provide viability in a multigenerational community it is critical to establish a set of facilities and services for each age group (Alexander, C., et al., 1977). Therefore, programmatically a multigenerational community should include opportunities, services and settings that are supportive for everyone. Based on the stages of the life circle by P. Laslett (1991) the needs of four age groups were analyzed in terms of physical spaces and services (figure 27).

For 1st age (an infant, a toddler with a mother) it is important to have an access to pediatric healthcare services, daily essentials (grocery, pharmacy, stores), public transportation, daycare and social services (for example, counseling). Spatially it should include an outdoor space for walking, social gathering (for sharing experience among young mothers), and playgrounds.

Figure 27. Four ages (Laslett, P., 1991)
1st age (children) should be provided access to pediatric healthcare services, activities outside school, sports facilities, babysitting, educational institutions. Programmatically their environment should include spaces for loitering/playing, studying, sports activities, and spending leisure time / hobby.

For 2d age (adults), the environment should be arranged for convenient access to daily essentials, episodic services, like theater, library and etc., public transportation between work and home, babysitting or pet sitting. The spatial list for the 2nd Age could consist of work space, work place at home, space for spending leisure time, sports activities and social gathering.

For the 3d age (younger retired people), healthcare services, daily essentials (pharmacy, grocery, stores), episodic services, public transportation, caregiving and housekeeping should be available. The spatial list should be composed to include outside and/or inside space for walking, space to work at home, places of social interaction, places for a hobby, physical activity and space for family gathering.

For the 4th age (dependent elderly people) there should be access to healthcare services, supporting ADL (activities of daily living) and IADL (instrumental activities of daily living) services, daily essentials (pharmacy, grocery), public transportation,
caregiving and housekeeping. Also, it is necessary to organize spaces for walking, social gathering, hobby, physical activity and family gathering.

To conclude, this thesis proposes a common spatial list developed on four planning levels: “Small” is a level of design a living unit, “Medium” is a level of a site, “Large” is a level of surrounding neighborhood and “Extra-large” is a scale of context and city. “Small” and “Medium” scale requirements drive the design of a new multigenerational community, whereas “Large” and “Extra-large” scales refer to requirements of the surrounding context for choosing a site for a future project of a multigenerational community.

The spatial program on a “Small” scale includes living essentials: bedroom, bathroom, kitchen, living room, dining room, a place for storage, room for hobby, study or work. The “medium” scale consists of space for a medical home, retail space, storage for bicycle, baby buggies, daycare, community room, workshops, space for co-working, fitness room, playgrounds, space for walking, yard / outside space, sports grounds, play grounds, and accommodations for guests.

To choose a site the following facilities and services should be located within an accessible distance: pediatric and other primary healthcare services, public park/
recreational area, daycare, primary school, middle school, high school, sport facilities, outside school activities/hobby/ additional education, daily essentials: grocery, pharmacy and other stores, healthcare inpatient services, healthcare outpatient services, episodic services (theatre, library), social services: counseling (figure 28).

The next step in achieving the formulated goals was to understand the dimensions of the built environment in a multigenerational community, by other words, to understand what objectives should be applied to compose the spatial program of a multigenerational community.
Figure 28. A spatial list of services and settings for all age groups
3.2 OBJECTIVES OF THE BUILT ENVIRONMENT

A literature review was done to find those objectives of the built environment, which makes it a supportive milieu for all ages (figure 29). The objectives or goals in a multigenerational community should be essential for each age.

Significant attention was taken to the issue of intergenerational interaction (C. Alexander, O. Newman, P. Ebner, and N. Ruggiano) and socio-cultural changes of modern society triggered by the demographic aging of the population. Architecturally the environment should prevent social isolation and conflicts between generations and at the same time promote a sense of community and encourage social interaction. This objective was called “Social responsible environment.”

As it was described above, the age balance in a community is one of the essentials for the creation of a healthy environment. So, the second objective is to create a “Healthy environment” which promotes the cognitive and physical well-being of individuals in any age period.

One of the important attributes of a healthy community is designing compact, high-density, mixed-use and walkable environment. These features make the environment physically accessible to everyone. Another dimension of accessibility is
Figure 29. A literature map
that physical access of the built environment refers also to services available at an acceptable distance which could be freely reachable by everyone. It is crucial that pathways and spaces in the built environment have a universal character and be physically accessible to every user with various physical, cognitive and age-related abilities (figure 30). The principles of Universal Design are forward to make the environment and other design products are usable by everyone.

Universal Design is also targeted on prevention of errors and accidents. This feature makes the environment safe for usage by everyone. The issue of protection the living environment from crime is another essential dimension of quality in the built environment. O. Newman, J. Jacobs, E. Wood described the importance of a strong sense of community and territorial identification to strengthen the behavior attitudes of residents to protect their community.

One of the methods to increase the responsibility for the built environment and evoke a protective attitude of residents for their community is to make it adaptable which means an environment that is able to response to the individual needs of every user and to accommodate future changes in these needs.

The last goal is to create a financially accessible environment – affordability.
To be able (in this sense economically) to live in adequate housing is an essential right of everyone, and affordability is also a tool for the creation of a strong supportive community with mechanisms of mutual support and self-help. For instance, communal housing with private living units and some shared spaces not only reduces the cost of living but also encourages social interaction between residents.

To sum up, there were found six dimensions of quality in the multigenerational environment: a socially responsible, healthy, accessible, safe, adaptable and affordable environment (figure 31). All of them are interrelated with others and complemented each other.

Figure 31. Objectives of the built environment
CONCLUSIONS:

The analysis of the needs of four age groups was done to compose a spatial program list on different planning scales: from the level of living unit to the level of city context. Based on a literature review, six major objectives or dimensions of the built environment for multigenerational living were defined. To achieve these objectives it was necessary to developed a set of design strategies which will be universal, and applicable to any project of a multigenerational community.
4. DESIGN STRATEGIES

Design strategies are imperatives that applied to all planning levels from the level of living unit to the level of context or city. Design strategies include design guidelines and site selection criteria. Design guidelines provide a set of design recommendations for developing a multigenerational community on the level of complex and site. Whereas, site selection criteria are requirements to a context for the future project (figure 32). Building from the framework of the previously established objectives, design strategies were developed based on a literature review and best practice case studies. Then they were verified during non-participant observation regarding their feasibility and application into existing built multigenerational communities in the U.S.A, Switzerland, Germany, Austria, and Denmark.

The first part of chapter 4 is devoted to the detailed description of seven guidelines and the second part of this chapter is about site selection criteria. The overall structure of the design guidelines is organized from the most comprehensive guidelines, that refer to all planning levels from individual units to the scale of a city, to more particular and detailed but still important guidelines. All seven guidelines complement each other to thoroughly achieve the objectives: healthy, safe, adaptable,
socially responsible, affordable, and accessible environment. Each objective could be achieved through a combination of design guidelines and site selection criteria (figure 34). At the same time every guideline is targeted to achieve several objectives.

Figure 34. Performance thinking framework
4.1 DESIGN GUIDELINES (figure 35)

1 [Density] is a quantitative dimension of quality in the built environment that impacts how efficiently resources are used (figure 36,37). Traditionally density is measured in the number of people in a given area (population density, persons per acres or hectare, etc.), the number of living units in a given area (dwelling unit density. dwelling units per acre or hectare), and the size of the building on a site (floor area ratio or FAR which is a ratio between total floor area of a building and the site area) (“Visualizing Density”, “What is density?”). Housing density in part determines the level of accessible and walk-able services that can be supported by a given neighborhood. In this case, density is associated with a diversity of available amenities such as grocery, pharmacy, retail and dining options, worship, educational institutions, cultural buildings, and etc. (Campoli, J., 2012, p. 14). Usually, density refers to some established preconceptions.
For example, a low-density neighborhood is typically associated with private ownership, plenty of green space, private yards (figure 38). However, a low-density community could be an isolated suburban sprawl without any green space (figure 39). Whereas, high-density is often associated with overcrowding, overloading of the existing infrastructure, traffic congestion and a lack of personal space and privacy (figure 41). However, in an opposite way a high-density neighborhood could be a viable human scale environment (figure 42). Therefore, two different physical forms could have the same value of density (figure 40).

Figure 38. A low-density neighborhood. Source: kthomsen.com

Figure 39. A low-density neighborhood. Source: smartgrowthamerica.org

Figure 40. Two architectural forms by the same density
Density itself can’t produce quality within the built environment but it definitely has an impact on determining walk-ability, safety in some cases and the viability and access to a wide range of services.

Density is not only a key factor for sustainable development and rational usage of natural and artificial resources such as land, people, construction materials, services provided, water and etc. Density is crucial for both physical and social dimensions of the built environment. For the physical performance of the built environment, density is important for the creation of compact, cohesive, accessible, walkable and diverse or mixed-use environments. At the extreme low end of density, the environment is typically an auto dependent, sprawling or functionally segregated landscape that is an unsustainable waste of land and other physical resources.

Density also has an impact on the social dimension of the built environment (Rowe, P. G., 2014). A dispersed, automobile dependent, broken physically and low-density environment deprives people of an opportunity to collaboratively interact with each other. The less physically mobile and more dependent users of the built environment such as: the elderly, people with disabilities, and children become isolated from the rest of society and each other. In the U.S.A, the creation of low-
density suburban neighborhoods began after the Great Depression, rapidly increased after WWII and was driven by automobile ownership and market-based impulses. The widespread use of the automobile as the sole mode of transportation for many people has led to spreading functions and increasing separation between them, which brought a new sickness in urban design - suburban sprawl (Jackson, R., 2012). An “Autocentric community” (Jackson, R., 2012, p.59) deprives an essential right of independence for the elderly, who can no longer safely drive, as well as disabled people and children, who are more vulnerable members of society.

To conclude, there should be sufficient density to support walkable and transit oriented access to a wide range of services and opportunities for social interaction in order to support a multigenerational community. However, since density by itself is not responsible for quality in the built environment it should be accompanied with other design guidelines.
Figure 44. Gradation of spaces with different territorial claims and objectives

This means designing a clearly delineated sequence of spaces with different levels of access from private to public (figure 43). This guideline has a significant role in the creation of a safe, social responsible and healthy environment (figure 44).

A clear sequence of spaces with different levels of spatial definition and access allows residents to understand spheres of their influence on their territory, assists in fostering a sense of belonging and identification to this place and consequently, to increase responsibility for maintenance of a place among those who identify with it, have or assume a sense of ownership over it. The fact that older adults are inclined to demonstrate a strong territorial behavior increases the importance of this guideline (Ruggiano, N., 2012).

In situations when an area of responsibility is not clear enough, a shared space
tends to look and feel anonymous and doesn’t have any traces of usage. As an example where this guideline is not being satisfied is at “Sankofa house”, housing for kinship families and young adults in Chicago Illinois U.S.A (figure 45). There are no intermediate spaces between building facade and the adjoining yard, therefore common yard belongs to nobody and looks unusable. The knowledge of the exact boundaries of sphere responsibility and influence helps also to avoid conflicts between residents because it hinders undesirable intervention into semiprivate or private areas with restricted access. Another important moment is when a gradation of spaces facilitates differentiation of privacy: from personal to group privacy, which also plays a role for building a sense of community among residents (Howell, S., 1980).

A clear gradation of space also has an important impact on the well-being of residents of all ages. The experience of identification and belonging to one’s territory has a positive influence on the cognitive health of people (Kruse, A., 2014). Also, the sense of identification with a place facilitates familiarity with the environment.

In a landmark study Newman claims that the territorial identification is a fundamental trigger for fostering control and protective behavior among residents in multi-family housing (Newman, O., 1973). Protective behavior is caused by a feeling of
ownership and responsibility for a place and identification with this place.

There are three main issues regarding this guideline: firstly, to arrange a sequence of spaces with different territorial claims, secondly, it is important that a common space should be shared by a small number of users, and lastly, boundaries between spaces with different territorial claims should be transparent (figure 46).

Figure 46. Strategies to achieve “Gradation of spaces with different territorial claims”
First of all, spaces with different territorial claims and diverse levels of physical access should be organized in a hierarchical order: from a set of spaces with one or two users to a shared space by several users. In other words, the spaces should be gradated from private to public spheres of influence. In the residential complex SØMÆRK in SØMÆRK, Copenhagen, Denmark there is an easy readable sequence of spaces from public, separated by water boundary, semipublic space, another semipublic space and semiprivate space and etc. (figure 47, 48).

A common space should be shared by a small number of users (Newman, O., 1973., Hertzberger, H., 1991). In this case, residents are more likely to feel a sense of identity, ownership and responsibility for maintenance and safety of a shared space. If there are too many users, nobody feels responsible for a place. As an example, a piece of a semiprivate hall in co-housing “Jamaica Plain” Boston Massachusetts, U.S.A. In spite of the fact, that on the administrative level, the hall doesn’t belong to any residents, inhabitants of two living units identify their sense of ownership and influence over this dead end hallway (figure 49,50).

Finally, the last strategy is the creation transparent clear boundaries between spaces with different territorial claims. It is possible to achieve through articulation...
of forms, space, materials, color and etc. In a multigenerational community “Bridge Meadows” Portland Oregon, the threshold between public sidewalk and semiprivate entry to the units is a small planting area with shrubbery and a small tree, a slight change in elevation so that the entry is slightly higher than the sidewalk and a sheltering canopy over the entry. These subtle features help differentiate between what is clearly public space and the personal but open space of each household (figure 51,52).
The interstitial space or “in-between” (Hertzberger, H., 1991) is a transition or a threshold between outside and inside, between the larger public realm and increasing levels of privacy and personal space (figure 53, 54). The interstitial threshold is also important for providing a safety because in this case “in-between” could be for residents a point of “volunteer control” over the public space of a community (Jacobs, J., 2011, Newman, O., 1973, Newman, O., 1996). However, the interstitial space should be designed in a delicate way to avoid the experience of “offensive surveillance”, which means a displeasing feeling of being watched by others (Howell, S., 1980). Some people perceive the observation by others as an intervention of their privacy.

The dual nature of “in-between” is unique: on one hand, it can help residents feel safe and secure, and from another perspective, it is targeted on establishing a transitional and somewhat protected connection with the outside world. It has been
demonstrated that a “...contradictory desire for intimacy on the one hand and a connection to the outdoors on the other is still anchored deep in our subconscious...” (Lüdtke, I., 2014, p. 94). Herman Hertzberger claims that “…the threshold as a built facility is just as important for social contacts as thick walls are for privacy” (Hertzberger, H., 1991, p. 35).

An interstitial space allows someone to be outside but still separate from complete immersion into the public realm in the often compressed boundary between public and private realms in a city which can definitely have a positive influence on physical well-being. Interstitial spaces provide an opportunity for social contact and help avoid isolation and deprivation, which can have an effect on cognitive well-being. Physical well-being. Interstitial spaces provide an opportunity for social contact and help avoid isolation and deprivation, which can have an effect on cognitive well-being. This guideline involves two interstitial issues in a community: “in-between” space and pathways.

[In-between] From observation, it was found that a deep threshold is more effective than a shallow one. The Dutch stoop which was brought and applied to Northern American cities is a traditional example of a relatively deeper threshold on
a city street than would otherwise occur if the entry to each household was simply a door at street level. The raising of the private zone above the sidewalk is critical as is the space to occupy between the sidewalk and entry (figure 55). A contemporary example of the stoop can be found in various projects in Europe. For example, in the EgebjerGGård, Ballerup, Denmark “in-between” space is a deep enough to experience a dual feeling “to be outside while inside” (figure 56, 57).

Another way to establish “in-between” space is to differentiate between the level of the observer and observed which helps to avoid “offensive surveillance” (Howell, S., 1980, p.67). The upper terraces in an “Integrated Living” project in Kempten, Germany are popular places for social gathering, dinners and community meetings because they separate the activities held on this terrace from observation by people on the street below (picture 58, 59).
O. Newman calls the public paths leading from outside such as stairs, corridors, elevators “the most vulnerable places” because usually they are outside of the residents’ control (Newman, O., 1973). That is why it is crucial to make public pathways short, transparent and observable from various vantage points. A multigenerational community in Meckenbeuren, Germany is a good example of implementation of this principle since all semipublic stairs are enclosed by glazed walls that enable people from various vantage points to observe who is using them and allows people in them to observe from within them (figure 60).

4 [Incomplete space] This guideline involves providing residents opportunities to personalize a space (figure 61, 62). The physical form of space where people live or have a sense of ownership should be opened to interpretations. H.Hertzberger (1991, p. 150) calls this characteristic “interpretability”, which indicates a configuration of form that can be completed and filled in differently by the occupants according to their differing needs initially and changing needs over time.
This mechanism evokes an experience of belonging and a sense of identification with one’s place and it builds a sense of familiarity and ownership with a space or place. One’s ability to create and inhabit a familiar environment has a positive impact on the cognitive health of its inhabitants (Kruse, A., 2014).

An example of this approach is an affordable housing project in Chile “Quinta Monroy” by the architectural firm “ELEMENTAL” built in 2003. The architects designed a basic structure which was organized to enable the residents to infill and finish it according to their preference (figure 63-65). Basic units were designed with fill-in space in-between them. The residents then occupied and expanded into these voids according to their individual needs over time.

From site visits conducted by the author in Europe, this principle was found in the multigenerational community “Generationen Wohnen” Am Mühlgrund” in Vienna, Austria where the simple concrete benches separating personal space from the path have been interpreted and reconfigured by residents in various ways (figure 66, 67).
This involves the ability of space to accommodate various preferences of users and the changing needs of inhabitants (figure 68, 69). The ability of the built environment to accommodate the differing and changing needs of a diverse population of residents is important not only because it is a response to changing needs over time but it is also crucial for developing a sense of ownership and control among inhabitants and it evokes a sense of identification with a place.
In the 1960s the importance of residents completing their personal living space by themselves was initially noted by the Dutch architect John Habraken (Schneider, T, 2007). In his book “Supports: an alternative to mass housing” he describes a system of support and infill, where “support” is a basic unchangeable part of a building and “infill” is an individual interpretation of a user. Habraken suggests not only a technical solution, but he emphasizes the value of inhabitants’ self-expression: “We are dealing with activities related to building and dwelling. It is about personal considerations and decisions...” (Habraken, 12). Herman Hertzberger under the influence of the Structuralist movement also points out a distinction between “form” and “usage” or “structure” and “filling”, “competence” and “performance”. He describes a “structure” as a competence, an ability of space to be interpreted. “Structure” or “form” is stable and “collective given”, while “usage” is “individual interpretation”, the experience of a user (Hertzberger, H., 1991, pp. 93-112). There are two ways to make a space adaptable: to create a polyvalent space and to design an open-neutral plan.

According to B. Leupen (2006, p.23), the nature of polyvalent space involves a possibility to change functions and activities between rooms. That’s why the spatial relationship of rooms between each other is very important. He illustrates it
Leupen names “Star”, “Circle”, and “Grid” are more polyvalent models because they have more options for arrangements and combinations between activities. The most famous example of a polyvalent building is the experimental housing “Diagoon” in Delft, the Netherlands. In this house, the basic structure allows to make a variety of interpretations within the same configuration of space (figure 71, 72).

Figure 70. A study of patterns in polyvalent spaces. A Chain Model, B Star Model, C Star Model with central room, D Circle Model, E Grid Model (Leupen, B. 2006)

Figure 71. Experimental houses Diagoon. Architectuurstudio Herman Hertzberger. 1971. Delft, The Netherlands. Source: architectureireland.ie

Figure 72. Experimental houses Diagoon. A variety of interpretations within the same configuration of space. Source: Hertzberger, H., 1991
Another way to make a space adaptable to changing needs is to design an open-neutral plan, a situation when an architect designs a generic empty space and gives to future residents an opportunity to fill it out in any way that prefer. This method was applied in the multigenerational community “St.Leonhard Garten” in Braunschweig Germany, where the architect simply provided an the empty space with defined wet zone of bathrooms which was interpreted and filled out according to preferences of it’s inhabitants (figure 73-74).

6 [ Efficiency] This guideline involves “compressing or compromising between functions” (Domer, K., et al., 2014, p. 162), to use the least possible space to support occupant needs without wasted or unusable space, or to make single spaces that can be used for multiple of different purposes simultaneously or at different times (figure 75, 76).
Such strategies like reducing the space for circulation, optimizing the sizes of living spaces and the connection between them could create a compact but well-organized and affordable place for living. Another example could be spaces that serve more than one purpose, such as a room that could be both an office or guest bedroom, or a passageway that also functions as a closet. Moreover, minimizing supports sustainable future development because it helps to reduce the resources needed for building, the embedded energy in those resources as well as the energy needed to maintain and temper them and the overall environmental impact of the setting. These motivations were the starting point for the movement “Small House Society” in the U.S.A, which advocates the construction of compact efficient houses to support sustainable living. Another interesting example of application this principle is a project “My Micro NY”, that proposed apartments with a floor area of only 285 sq.ft (figure 77). Every zone in the apartments is optimized solution for every day usage: working, sleeping, eating and etc. Moreover, it is suggested that the apartments are transformed during night and during day in different layouts. The project is an innovative solution for life in an urban, high-density environment.
Externalization means the relocation of some functions from an individual apartment to a shared community area or space (figure 78, 79). Today externalization is one of the primary ways to make housing affordable (Domer, K., et al., 2014, p.54).

The extreme example of this strategy is Aura housing in Tokyo, Japan, which was designed without a kitchen and simply provides a bathroom without a bathing area because the residents use noodle kitchens and bathhouses located in the neighborhood (figure 80, 81).

Externalization not only reduces the cost of housing but encourages social integration and interaction within a community. According to Andreas Kruse, the creation of shared social space plays an important role in allowing people to contribute to a shared level of engagement and responsibility, and to participate in a social and spatial environment regardless their age, or physical and mental abilities. He called this approach “sharing responsibility” to support all members of a community (Kruse, A., 2014, p.57-58).
The idea of externalization is expressed as communal living or home-sharing, where residents have reduced personal or private space and share some common amenities like guest quarters, a laundry, kitchen, fitness room and so on. In this case, the cost of an apartment or renting cost is reduced because the size of a living unit is smaller and the cost of shared spaces is distributed among all residents of a community. Home-sharing living is an applicable concept for all ages. For example, a common living room in “Steinacker” is one of the favorite place among residents for celebration (figure 82).
Today a growing trend in affordable housing includes cluster apartments, which are based on the idea of communal living, where the living room, dining room and kitchen are shared usage and the residents themselves live in private apartments (Hugentobler, M., et al., 2016) (figure 83, 84).

Figure 83. Cluster apartment
Source: Hugentobler, M., et al., 2016

Figure 84. Hunziker Areal, Zurich, Switzerland
2008 – 2015
Source: Hugentobler, M., et al., 2016
4.2 SITE SELECTION CRITERIA

Based on a literature review and case studies five essential criteria for selection a site for a multigenerational community were identified: 1. Link to existing infrastructure 2. Connection to public transportation 3. Mixed-use 4. Walkability 5. Connection to nature (figure 85).

[Linked to existing infrastructure] A survey conducted among OLLI members (Osher Lifelong Learning Institute) at Clemson University, Clemson SC and OLLI members at Furman University, Greenville SC, shows that respondents are not satisfied with how the places where they live are not connected to the existing infrastructure and city tissue. This is related to a problem of dispersed, not cohesive environment in South Carolina, where all functions (educational institutes, grocery stores, pharmacy, stores, healthcare facilities and etc.) are separated from each other and require driving from one place to another. Dr. Margrit Hugentobler, a deputy director of ETH Wohnforum – ETH CASE in Zurich, who conducts research projects that evaluate multigenerational communities in Europe, asserts that a link to existing infrastructure is one of among the two the most important things for the success of a multigenerational community. A link to existing infrastructure means integration a future project to a built city tissue with
developed functional and transport network.

[ Connection to public transportation ] The degree of connectivity between a designed community and the larger context in which it exists relies on an accessible, reliable and usable network of public transportation. Case studies of multigenerational communities were analyzed in terms of accessibility to stops along public transportation and the possibility to use public transportation as an alternative to individual transport modes (figure 86). It was found that among 6 chosen case studies the longest distance to a public transportation form stop from a community is 600 m (2000 ft). According to Gehl, J (2011), a walkable distance is around 500 meters.

Figure 86. Access to public transportation. Case studies
The ability to use public transportation is significant for a couple of reasons. First of all, public transportation is an alternative to expensive and ecologically unsustainable individual transport. Also, the importance of accessibility of public transportation increases while a person ages with decreasing ability to drive safely.

[**Mixed-use**], which means the integration a future project into a functionally and architecturally diverse environment. A diverse environment increases accessibility to facilities and services appropriate and useful for different age groups (for example, a school and daycare for children, a clinic for the elderly and etc.). Mixed use neighborhoods help to reduce the time traveling to receive these services, provides a range of opportunities of available options for inhabitants and brings viability to the surrounding environment.

[**Walkability**] refers to access to services, convenient width of sidewalks, safety of crosswalks, design solutions that are appropriate to climate and topography (shadowing in hot climate), a connectivity with a network of sidewalks (Jackson, R., 2012, Campoli, J., 2012, p. 24, Ball, M.S., 2012). J. Gehl claims that a walkable distance is around 500 meters (0.3 miles) (Gehl, J., 2010, p. 121). 500 meters is also measurement for access to daily essentials (grocery store, coffee shop, pharmacy and
etc.) (Schwalbach, G., 2009, p. 44). However, walkability should be measured also by qualitative dimensions or how comfortable it is to walk. Today there are some number of tools which help to measure walkability. For instance, “Google map” provides information about available services in numeric measurement. Whereas, “Walk Score” gives assessment of topography, distance to services, connectivity, and crime rank of a given place by providing a number of walk scores. Walkability is also related to connectivity and cohesion of the built environment. A compact, high-density environment creates a place, where all functions and services are integrated, compactly located, and consequently, physically accessible to users.

[Connection to nature] helps to reduce anxiety, stress and depression what is extremely important in a city context (Jackson, R., 2012). It is also helps to integrate the inhabitants with natural environment.
CONCLUSIONS:

The defined set of guidelines, working at different planning levels, together with formulated site selection criteria, served as recommendations to define a successful location of any multi-generational project, and will enable the creation of an environment beneficial for all ages. Also, the application of these identified design strategies (design guidelines + site selection criteria) into a conceptual project is critical for testing them as tools for any project of multigenerational communities.
5. CONCEPTUAL PROJECT

In order to demonstrate the principles outlined in this thesis and the application of the proposed guidelines, a conceptual proposal for a multigenerational community was developed architecturally for Greenville, South Carolina. The design proposal outlined in this chapter was important for the author to understand the feasibility and application of the developed theoretical framework.
5.1 SITE SELECTION

The project is proposed within the context of a small American city. The proposed location was based on the idea that the recommended design strategies must be applicable in an intermediate context between extremely urban and extremely rural conditions. The author was guided by the proposed site selection criteria to identify a plausible site and setting for the project. The most important criteria were: link to a viable and relatively complete existing infrastructure of available services and amenities appropriate to the cross section of occupants proposed for the project, connection to public transportation and walkability. Based on these preferences, a site was chosen in the small city of Greenville South Carolina. The site is located in the south-west end of the city center at the intersection of S. Main street and Oneal street. This place is integrated into the walkable downtown of the city with a developed functionally diverse (figure 87).
Figure 87. Connection the chosen site and city tissue
The site was analyzed based on accessibility to services for different age groups at different scales. Services and settings that serve the needs of 1st Age children such as schools, day care, pediatric healthcare services are shown in red on the maps. Services, primarily targeted to adults, for examples, bars, beauty salon and etc., are marked in blue. Facilities and services for the elderly, for instance, a nursing home, are yellow on the maps. Services needed or used by all ages are identified by green color (figure 88-90). The selected site is integrated within a well-developed infrastructure with available services to the cross section of future inhabitants. However, the closest pediatric healthcare services are located far away (around 0.7 mi), as well as the nearest child care facilities such as preschool, or kindergarten are around 1 mile away. The closest daily essentials: pharmacy (0.5 mi) and grocery store (0.8 mi) are also considered to be at a non-walkable distance. Therefore, a spatial program for the design proposal should include a pediatric healthcare clinic, daycare, grocery store and pharmacy.
Figure 88. Site analysis. Macro scale.
Services and facilities are targeted for four ages

1 age Children
2 age Adults
3, 4 ages Elderly
all ages

accessible distance radius 0.3 mile
selected site
Figure 89. Site analysis. Mezo scale. Services and facilities are targeted for four ages.
Figure 90. Site analysis. Micro scale. Services and facilities are targeted for four ages:

- 1 age: Children
- 2 age: Adults
- 3, 4 ages: Elderly
- All ages

Accessible distance radius 0.3 mile is shown on the map.

Selected site is marked with a red line.
5.2 SPATIAL LIST

Three target groups were identified for this project: young families, single parents and the elderly as more vulnerable categories of residents. This decision was driven by thoughts that if the proposed project will be supportive for these selected groups, it would be beneficial for everyone. Also, young families, single parents and the recently retired are the most likely to collaborate with each other in real life. For example, the elderly could help young parents in raising their children, whereas, young people could help the older adults with learning technological innovation. If the proposed solution can be designed to be viable for these target groups it suggests this solution should be supportive and beneficial for the larger population (figure 91).
A program list composed by accumulating needs of four ages, which was described in chapter 3, was adapted to the chosen site. The disadvantages of the location for the conceptual projects (pediatric healthcare clinic, daycare, grocery store and pharmacy) were supplemented to a spatial program list. The defined functional list was applied to the site, based on a search of massing, regulations and codes, and followed by “Efficiency” guideline. The determined spatial composition of future community helped to formulate precisely the programmatic list (figure 92).
Figure 92. Framework for defining a spatial program list

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Needs</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Age</td>
<td>- Daily walking - Work at home - Social gathering - Family gathering - Physical activities - Spending leisure time - Work at home - Family gathering - Physical activities</td>
<td></td>
</tr>
<tr>
<td>2nd Age</td>
<td>- Pediatric healthcare services - Daily services: grocery, pharmacy, stores... - Healthcare inpatient services - Healthcare outpatient services - Episodic services - Social services: counseling - Social gathering - Work at home - Spending leisure time - Family gathering - Physical activities</td>
<td></td>
</tr>
<tr>
<td>3rd Age</td>
<td>- Pediatric healthcare services - Daily services: grocery, pharmacy - Social services: counseling - Social gathering - Work at home - Spending leisure time - Family gathering - Physical activities</td>
<td></td>
</tr>
<tr>
<td>4th Age</td>
<td>- Pediatric healthcare services - Daily services: grocery, pharmacy - Social services: counseling - Social gathering - Work at home - Spending leisure time - Family gathering - Physical activities</td>
<td></td>
</tr>
</tbody>
</table>

**Site + complex**
- Grocery store 1200 sq ft
- Mather cafe plus 3190 sq ft
- Ambulatory clinic 4450 sq ft
- Physical therapy 1740 sq ft
- Co-working space 1740 sq ft
- Learning center 4450 sq ft
- Day care 1400 sq ft
- Community room 460 sq ft
- Other communal spaces includes guest room, storages, kitchen

**OUTSIDE:**
- “Race track”
- Courtyard
- Playground

**TOTAL DWELLING AREA:** 28360 sq ft

**TOTAL:** 25610 sq ft

**Type of dwelling unit**
- **Type A Live / Work Unit**
  - 3 units
  - 1350 sq ft
  - 4050 sq ft

- **Type B Polyvalent apartment**
  - 6 units
  - 1010 sq ft
  - 6060 sq ft

- **Type C Open-neutral plan**
  - 3 units
  - 960 sq ft
  - 2880 sq ft

- **Type D Living unit + Garden**
  - 3 units
  - 720 sq ft
  - 2160 sq ft

- **Type E Living unit + Green room**
  - 6 units
  - 620 sq ft
  - 3720 sq ft

- **Type F Communal apartment + Terrace**
  - 4 units
  - 980 sq ft
  - 3920 sq ft

- **Type G Cluster apartment**
  - 10 private rooms + common area
  - 5570 sq ft

**TOTAL DWELLING AREA**
- **TOTAL DWELLING AREA:** 28360 sq ft

**Social program list**
- Space for medical home
- Retail space
- Storage for bicycle, baby buggies
- Daycare
- Community room
- Work at home
- Spending leisure time / hobby
- Family gathering
- Physical activities
- Site requirements to context:
  - Pediatric healthcare services
  - Public park / recreational area
  - Kindergarten / daycare
  - Primary school
  - Middle school
  - High school
  - Extracurricular activities
  - Public transportation
  - Daycare
  - Community center
  - Work at home
  - Spending leisure time / hobby
  - Family gathering
  - Physical activities

**INSIDE:**
- Grocery store 1200 sq ft
- Mather cafe plus 3190 sq ft
- Ambulatory clinic 4450 sq ft
- Physical therapy 1740 sq ft
- Co-working space 1740 sq ft
- Learning center 4450 sq ft
- Day care 1400 sq ft
- Community room 460 sq ft
- Other communal spaces includes guest room, storages, kitchen

**TOTAL DWELLING AREA:** 28360 sq ft

**TOTAL:** 25610 sq ft
5.3 DESIGN SOLUTION

The primary concept for this project was to create a vibrant socio-spatial scene where different ages coexist together, collaborate with each other and engage in a complicated network of social interaction and community activities. An inspiration for this image was a street in an old city where each member of this scene has his or her own special role (figure 93).

Figure 93. “The scene of an intricate sidewalk ballet” Photo by Vivian Maier
The community is organized in two parts: a wellness center and a residential component (figure 94). The wellness center is a three-story structure fronting S Main street. The residential part is divided into two connected blocks. The first apartment building situated on Oneal street is designed as a five-storey block to protect the rest of the community from noise pollution from Oneal and S Main streets. Another four-storey block is located in a deeper part of the site (figures 95, 96). A main pedestrian entrance to the community is proposed from Oneal street next to an entrance to underground parking for residents of the community. A secondary pedestrian entrance provides access for residents to Rhett street. An alley provides access to the rear of the complex by connecting Wardlaw street and Rhett street (figure 97). This alley provides a drop off and pick up entry for the day care center and the site overall.
Figure 97. Site plan and first floor plan
The final spatial solution was defined during a series of studies. It was driven by main idea to create an intermediate space, a place for social interaction between residents of all ages or a scene for “intricate ballet”. It should be outside space with a sense of enclosure and intimacy, so residents could feel themselves inside their familiar milieu but being connected to the community (figure 98).

Figure 98. Study model
The heart of the community is a wellness center, located on S Main street (figure 99). On the first floor of the wellness center is a “Mather café plus”, a place for social gatherings for young and old, table games, informal lectures, and cooking lessons. In addition to the café a local corner grocery is located to supplement more remote grocery stores in the neighborhood. Also, in the passage way that links the complex to Main Street and connects the wellness center with the rest of the community, space is provided to accommodate a small farmer’s market. The farm market is not only intended as a place where people can purchase fresh food but also a place for communication between the residents and people of the larger community (figure 102). A learning center is located on the second floor over the café (figure 100). Space for co-working, study rooms, workshops, and a library are arranged around an enclosed courtyard on this level. This is a place of intellectual enrichment for young and old generations and also a place for intergenerational collaboration. For example, retired people with a lifetime professional experience could teach children here, or young people can educate the elderly on how to use electronic devices. On the third floor, an ambulatory clinic supports the residents of all ages (figure 101). Since these outpatient healthcare services are located within walkable distance from residents’ homes caregivers can
potentially have a greater impact on the prevention of some disorders and management of chronic diseases both through clinic visits and home health services.

Figure 102. View from the farm market
The wellness center is spatially connected across a courtyard to the residential part of the community (figure 97, 103). The main goal for the design of the housing component of this project was to create a diversity of options for residents with differing needs. The apartment block, which is higher is located on the eastern edge of the site along Oneal street, and the units in this wing are targeted on so-called “merchants” (figure 104). These are residents who want to be more involved in the life of the larger community or are engaged in a small storefront occupation or business. On the lower level along Oneal street there are live/work units and studio rooms are proposed to provide an opportunity to work at home or for additional work engagement. The westernmost wing of the community is located further from the streets and provides an opportunity to live in a quieter and greener atmosphere. This wing is designed for “farmers”, people who want to live in urban settings but retain a lifestyle of gardening.
that is common in South Carolina (figure 104). These residents are able to grow their own fresh foods since each apartment in this part of the community has a some green space: a garden, a green room, or south facing terrace (figure 97, 105). A community garden is located on the roof of this wing for all residents.
A small day care facility is located on the ground level of the southwestern end of this wing so that children can be dropped off via an extension of the alley behind the gardens (figure 96). Next to the main entrance to the complex are a community room with a laundry separated from outdoor space by a glass wall. The location and design of the community room and laundry provides an opportunity for a visual connection between the inside environment of the community and the public realm. This allows residents and others who are entering or passing by to be aware of community events held in the community room. Besides this communal area, each floor has a common room or area to filling out it according to needs of the residents (figure 97, 106).
Seven different types of apartment were developed to support diverse preferences of future residents. Type A is designed as a “Live/work” unit with a work space on the first floor and living space which includes: bedroom, living-dining room, kitchen, and bathroom (figure 107). Type B is a polyvalent apartment proposed for a young family with a child, or a young couple, or an elderly couple. The universal size of rooms and access to them from one lounge space provide a diversity of possible adaptations of this apartment to the different needs of future residents (figure 108).
Type C is an apartment with an open-neutral plan. It is also designed to accommodate a young family with a child, as well as young or elderly couples (figure 109). The initial condition for this apartment is an open space with a defined bathroom. The space could be filled out in various ways and configured by residents as they prefer.

Types D, E, F, and G are located in the western wing. Type D is located on the first floor. It is a compact apartment for a single older adult or for young or elderly couples. This apartment is provided with an adjoined private garden. The living space includes a bedroom and a living-dining room, which could be connected into one single space by opening a sliding door between them (figure 110).

Type E apartments are located on the second floor of the western wing and have approximately the same layout as type D. However, a “green” room is attached to the apartment so that future residents: a single person, or a couple could still grow plants even though they do not have a garden (figure 111).

Type F apartments are communal apartments with two bedrooms, two bathrooms and a shared area of living-dining and a kitchen. This type of apartment could support an elderly couple, who appreciate the private space, or for unrelated older adults, who decided to live together to support each other.
This apartment unit could also accommodate a single parent with a child, who both needs their personal spaces (figure 112).

Type G is designed as a single cluster apartment with 10 private rooms. Each two rooms have a small living room. Six pairs of rooms have a common area of dining, living and a kitchen. The apartment is designed for residents who are looking for a more socially and financially supportive environment (figure 113).
5.4 IMPLEMENTATION DESIGN GUIDELINES TO THE PROJECT

1. [ Density ] The primarily goal was to create a high-density but low-rise architecture of human scale. From a quantitative point, the variety of provided services in the community, efficient use of spaces, as well as a significant number of living units (27 apartments and 1 cluster apartment with 10 rooms) compose a compact environment. From qualitative point, special emphasis was taken to address important issues such as a diversity of levels of social interaction, different types of privacy, safety, sense of identification, personal interpretation of space, building a sense of familiarity, and etc.

2. [ Gradation of spaces with different territorial claims ] The main principle in socio-spatial organization of the entire community is based on this guideline (figure114). The established sequence of spaces from the public spaces formed by the wide sidewalks along S Main street and Oneal street to semi-private spaces inside the community was achieved through the articulation the boundaries between these spaces. For example, the shape of community room on the ground floor indicates a different character of access to the following space (figure 115). At the scale of living units, the distinction between a semipublic gallery lining each side of the central atrium.
or courtyard and semiprivate area of each entrance to an apartment is also achieved through form articulation (figure 116). The application of this guidelines helped to organize a variety of options for social interaction among residents.

3. [Connection outside-inside] Opportunities for occasional social contacts in the proposed project is very high because there is a system of interstitial spaces created (figure 117). Open galleries overlooking central spaces, enlarged stair landings, and extended balconies overlooking the street all create an opportunity for communication within the community as well as between residents and people from the surrounding neighborhood (figure 118). Interstitial spaces are expected to be popular places for residents in the warm climate of South Carolina because of the tradition of spending time in the shade and shelter a porch.
4. [Incomplete spaces] A number of empty spaces for future personalization and interpretation by residents were designed into the project (figure 119). For example, extended stair landings overlooking Oneal street encourage future residents to occupy these spaces and overlook life. These “incomplete spaces” could be attractive for residents for some reasons: firstly, they are oriented on a street overlooking activities, secondly, they are faced to the galleries which are main circulation paths internally in the community, so they provide opportunities for occasional “small talks” between residents, and lastly, they are located close to the community rooms, so events held in these in community rooms can extend into these “incomplete” spaces.

5. [Adaptable space] The complex includes a series of adaptable living units in the form of both polyvalent apartments (type B)(figure 120) and open-neutral plan apartments (type C) (figure 121). In the polyvalent units, access to the private space of each resident is provided through one common space, and provides a possibility for interchange between the functions and activities of the room. Also, the size of rooms (160 - 180 sq.ft) are suitable to contain any functions: a bedroom, a studio, a living room. So, these features provide a certain degree of polyvalence to this apartment and consequently, an opportunity to fill out the space according to preference of future
The apartment with an open-neutral plan is designed as a completely empty space providing the opportunity for residents to organize inside space according to their specific needs (figure 122). The only defined function is a bathroom with an established wet wall.

6. [Efficiency] is applied particularly in the design of living units and common spaces. The main goal was to make optimized space but at the same time any space within the community should be accessible and universal for everyone as it was stated in expected objectives. All living spaces were designed based on ergonomically-suitable and Universal design principles (figure 123).

7. [Externalization] Special emphasis was made to supplement compact living units with shared communal spaces to help establish a multigenerational model with a sense of community, system of mutual support and self-help. A laundry, communal kitchen, communal living room, and cluster apartment are designed to relocate some functions from personal usage to a shared communal sphere.
CONCLUSIONS:

This thesis is an attempt to demonstrate that multigenerational living is a viable forward-looking solution for the upcoming tremendous socio-demographic changes in American society. The purpose of this study was not limited to only theoretical investigation. The author believes in the importance of evaluating the theoretical framework through the application of a pilot conceptual project. Originally, through the literature review at least 10 design guidelines were identified. However, after observation conducted by author and site visits to best practice multigenerational communities, and evaluation during the design process some of the guidelines were not confirmed. This experience proved the importance of engaging in a comprehensive theoretical, experiential and practical investigation in the field of architectural design.

One of the serious limitations of this thesis study is fully understanding the operational and financial issue, that would be concerns of a developer, builder and operator of this conceptual community. The clarification of this question would provide a deeper understanding of the reality of multigenrational living in the U.S. Another limitation is that the majority of case studies are European, which exist in a significantly different financial, operational, cultural and urban contexts the U.S.
APPENDICES
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