



Smart Homes for the Elderly and the Role of Interior Designers

Kaan Gökçakan

*Ondokuz Mayıs University, Faculty of Architecture, Interior Design Department, Samsun, Turkey.
kaan.gokcakan@omu.edu.tr*

Mehmet Ali Altın

*Eskişehir Technical University, Faculty of Architecture and Design, Interior Design Department,
Eskişehir, Turkey.
maaltin@eskisehir.edu.tr*

ABSTRACT

Elderly people tend to have losses and disadvantages in many aspects that limit the quality of their lives. However, it is possible to reach the goal of being healthier, more secure and more autonomous with the help of various technological consumer products. Being professionally trained in matching people's needs to spatial solutions, an interior designer is expected to have an important role in this respect. As a matter of fact, an interior designer's profession requires being knowledgeable of specific user groups, such as elderly people, and being familiar about current advancements, such as new and emerging technological products. The aim of this study is to determine the role and importance of interior designers on smart homes for the elderly. First, the importance of tailored living spaces –especially for the people of older ages– is explained. The problems, losses and disadvantages of the elderly that affect the human–space relationship are revealed accordingly. Then the role of smart homes on enhancing the quality of older people's lives are examined. Finally, the role of interior design on helping elderly people to live more autonomously, safer and healthier is discussed.

Keywords: Interior design, Elderly, Problems of the elderly, Smart home, Technology.

INTRODUCTION

Technology assists people in a variety of ways in order to live longer and healthier. Technology, as a term, in fact does not only refer to the "digital" technologies such as smartphones, computers, micro-processors. As Merriam-Webster defines, the term technology means "The practical application of knowledge especially in a particular area (*http-1*).", which suggests that each new invention has been the technological advancement of its era as humanity progressed through time. A vast majority of the technological advancements has helped or is still helping us to have a longer life.

As happened throughout human history, future is set to present various changes to humanity. Future developments may cause a variety of concerns, yet some may cause unique opportunities. For instance, both concerns and opportunities may arise in the case of life expectancy. Life expectancy shows a constant improvement on the global scale (*http-2*) with the presence of constantly developing technologies. However, people encounter losses and disadvantages as they grow older, mainly because of the increase of non-functional cells within one's body (Kalinkara, 2004). The growing population of elderly people (*http-3*) could potentially cause several concerns as most elderly people face some kind of limitations due to their decreased physical, psychological and social abilities. Besides, elderly people are prone to being less autonomous and are more likely to be limited by their living spaces. These conditions could cause further harm for the people of older ages because unhealthy living arrangements and habits could lead to more health issues over time. Yet, even though future poses some concerns, it also presents opportunities, one of which is developing technologies that help the elderly to reach the goal of being healthier, more secure and more autonomous. Such help could be provided with smart technologies, devices, and interiors.



The aim of this study is to discuss and highlight the impact of interior design within this scope. Owing to technological developments, anyone can purchase a few consumer products and augment the quality of life, both for themselves and for the elderly. Yet, such technologies need to be precisely integrated and purposefully synchronized within the living spaces to provide maximum function. Also, to enrich a living space with technology does not guarantee the compensation of the deficits of an obstructive and limiting environment. Given the qualities and specifications that the interior design profession requires, it is likely to provide the best skillset, mentality and precision to address this situation.

1. Issues of Elderly People Regarding Human–Space Relationship

Currently there happens to be approximately 7,9 billion people on earth (*http-4*), each with different characteristics in the matter of physical condition, psychological state, moral values, cultural backgrounds, and so on. Therefore, each individual is likely to have different requests and requirements regarding the spaces they live in. This alone renders a one-size-fits-all approach unfeasible in the matter of living spaces. Even though standardization enables mass produced interior elements to be produced cheaper; each individual would still need a specific and personalized space in order to fulfill their spatial needs. It is safe to assume that billions of people spend a considerable amount of their day in some sort of an interior space, bearing in mind that sleeping alone almost takes up one third of a day. As one spends time in an interior space, one interacts with the environment at different levels, the major ones being physically and psychologically. As the most recent global pandemic demonstrated; the more a people spend time indoors, the more are they affected by the qualities and limits of that space.

Unfortunately, regardless of the global pandemic or the like, there are people that are quite limited by some sort of an interior, such as elderly people. The fact that people spend a significant amount of time indoors becomes even more pronounced at old age. According to Zorlu (2017), both the quality of life, and physical and mental health of the elderly are directly related to the housing and environmental conditions, where most of their day is spent. As pointed out by Kalinkara (2004), it is observed that the majority of the elderly population is unable to carry out home-related activities autonomously. Those who do try to continue carrying out such home-related tasks face various problems due to inappropriate settings or the limitations resulting from aging. Needless to say, old age is largely linked with decrease in ability to adapt to changing life conditions, as well as to the living spaces.

Developing technologies lead to advancements in medicine, consumer products, and many more. In addition to improved living conditions, people got to live longer: Demographic research suggests that no country in the world had a life expectancy longer than 40 years at the beginning of the 19th century, yet as of 2019, it was estimated that global average life expectancy was 72.6 years (*http-2*). Besides, as people live longer, the global population grows, thus the population of elderly people increases over time accordingly. Data from The World Bank (*http-5*) shows that the global population of elderly people (people that are over 65 years old) has shown constant increase since 1960, peaking at approximately 698,000,000 people as of 2019. It is also suggested that the percentage of elderly people among the world's total population has shown constant increase since 1984 as well, sitting at 9,099% of the total population as of 2019 (*http-3*). These increases seem to show permanence. Based on their data, Vollset et al. (2020) suggest that there will be an estimated 2,37 billion (in average) people who are over 65 years old by 2100. At that time, people of old age are estimated to represent approximately 27% (in average) of world's total population.

While being able to live longer or to see loved ones' longevity sounds pleasing, the fact that elderly people are exposed to increasing amount of difficulties remains. People may be affected by various changes and losses at any age; however, such disadvantages are



widely proven to rise rapidly in the later stages of life. Also, the changes and losses occur in different capacities and/or in a unique combination of abilities for each elderly person. These changes and losses affect many activities ranging from performing basic tasks to the autonomous use of interiors. Even though these disadvantages would differ from person to person, they can be categorized into four main categories: physical, cognitive, social, and emotional changes.

2. Physical Changes in Old Age Regarding Human–Space Relationship

The deterioration and losses at old age occurs in different structures and systems related to an individual's physiology, such as the disruptions of the body and movement, the circulatory and respiratory systems, and the basic senses. It is also possible to observe the effects of these changes on the human-space relationship.

First off, changes in body composition start with aging. Muscle loss and weakness occur besides decreased bone health due to such alterations (Sürücüoğlu & Özçelik, 2004; Kalinkara, 2004; Arpacı, 2005; Karadenizli & Dedeli, 2008). These changes in body composition directly impact one's daily activities and use of space, such as getting tired more frequently or being at risk for bodily deformations caused by home accidents. Elderly people's conditions need to be taken into account when using spaces, especially because of decreased muscle and bone health. These physical changes may further cause shortening and slowing of the steps, deterioration in the posture, impaired balance and increased falling tendency.

Another physical disadvantage in old age is related to the maintaining ideal weight (Özgen et al., 2004; Santrock, 2014; Özgün Başbüyük et al., 2017). Involuntary weight gain or loss can easily happen for an elderly person when compared to a young adult. Malnutrition-induced weight gain or loss may occur at old age as the necessary effort cannot be met for a balanced and nutritious diet. The difficulty in maintaining the ideal weight is also reflected in various problems in the use of space. Being underweight at old age is associated with such problems as inability to adapt to the temperature of the space (Engber, 2014) or ergonomic incompatibility with furniture (Güneş & Zaybak, 2008). High body mass index, on the other hand, is associated with deterioration in daily life activities, decreased mobility, decreased physical performance and decreased bodily functions (Villareal et al. 2006).

Besides postural changes, functional losses may occur in various systems of the body with aging. Circulation and respiratory systems are key examples in this respect, as both systems get exposed to deteriorations caused by aging (Elbaş & Arpacı, 2004; Karadenizli & Dedeli, 2008; Barusso et al. 2014) and have various effects on human-space relationship. For instance, rapid exhaustion and fatigue are only two of the important conditions that obstruct the use of interiors, as physical endurance is one of the key factors on completing –especially demanding– daily tasks. Increase in airway resistance, respiratory pressure, hypoventilation, and sleep apnea are also possible conditions that occur with aging (Kalan & Yeşil, 2010; Burr et al., 2012; Tedik, 2017) that could have various effects on indoor activities.

Some of the functional losses caused by aging also occur in the basic human senses (Bozian & Clark, 1980; Cacchione, 2016). Older people experience various changes in their sensory capacities as a natural result of aging (Drewnowski et al., 2002; Gordon-Salant, 2002; Ross, 2002; Schiffman, 2009; van Loenhout et al., 2016). For instance, not being able to see and/or hear properly are bound to have crucial effects on the use of interiors since sensory feedback is essential on how people interact with their environment. Losses in tactile sensation are likewise potentially dangerous.

3. Cognitive Changes in Old Age Regarding Human–Space Relationship

Along with physical changes, cognitive changes are also a part of the aging phenomenon.



Physical changes that occur while aging affect the brain, and therefore, the cognitive well-being. Various behavioral and cognitive functions are exposed to different effects depending on which part of the brain is affected (Willott, 2002). For example, the *hippocampus* in the brain –apart from its other activities– has functions such as mapping the layout in the physical environment, adapting one's body to physical environment, and following a pathway in the defined space (Hartley et al., 2014; O'Shea et al., 2016; Yassa, 2018). A successful spatial activity occurs only when the signals coming from different sensory organs are processed in the brain in order to form a mental perception about the physical environment (Mohler, Di Luca & Bühlhoff, 2013). However, research shows that the functions that feed spatial cognition decline with aging. Elderly people are likely to have problems at cognitive mapping of the environment, identifying the space, adapting one's body to the environment and following paths in space (Olton, 1988; Nadel, 2013; Richmond et al. 2018). All these complications are clearly linked to the use of space and interiors.

The normal course of aging is related to a decrease in some cognitive abilities (Harada et al. 2013). However, people may become exposed to various pathological processes in addition to the normal course of aging. These pathological processes can be explained under the title of dementia. Dementia, rather than being a disease, is a general phenomenon that covers nervous system disorders whose main symptoms are cognitive impairments which is caused by neurodegeneration (Prince et al., 2013). While the term dementia covers many cognitive disorders, Alzheimer's and Parkinson's diseases seem to be the most linked types of dementia that obstruct the use of space.

Alzheimer's disease is a type of dementia that can be characterized by progressive decline in cognitive functions such as memory, thinking, language, and learning capacity (http-6). The most common early symptom of Alzheimer's disease, which accounts for 60% to 80% of dementia cases, is having trouble remembering newly learned information (http-6). People with Alzheimer's disease are unable to perform certain cognitive tasks and therefore become dependent on others in various activities. Difficulty in performing familiar household tasks, placing objects in the wrong places, and/or confusion in time and space are possible symptoms of Alzheimer's disease (http-7). This also indicates that a special awareness is required about spatial arrangements to provide the most decent conditions for an Alzheimer's disease patient, because research demonstrates various levels of decrease in spatial abilities during this type of dementia (Tu et al. 2015; Parizkova et al. 2018).

Parkinson's disease on the other hand, is a progressive neurological disease that shows symptoms such as muscle tremors, decelerated body movement, and partial facial paralysis (Bakırcioğlu, 2016; Jankovic, 2008; Savi Çakar, 2018). People with Parkinson's disease have a disorder in their dopamine neurotransmitters, which is responsible for controlling movement, emotional responses, and the ability to feel pleasure and pain. The most typical indications of Parkinson's disease are tremor, bradykinesia, and limb rigidity along with gait and balance problems (http-8). In addition, patients could have a mask-like face that has lost the ability of expression and blinking frequency. Symptoms also include the forward inclination of the spine due to stiffness in the back muscles, a humped posture, and therefore an increased tendency to fall (Armstrong, 2008). Gait and balance problems alongside with rigidity and tremor increase the risk of falls, which may require a very long recovery period, especially for the elderly. Yet the risks of physical instability due to Parkinson's disease extends from unexpected falls to reduced mobility and physical activity, increased social isolation and decreased quality of life. All this information proves that a special awareness is much needed about the spatial arrangement in which a Parkinson's disease patient resides.

According to Lozano (2013), there are specific regions in a person's brain that are dedicated to different functions. With the proper activity of nerve cells, brain operates in



accordance with the expected purpose. However, impairments in the functions of nerve cells may occur. If the impairments occur in a region that controls the movement, symptoms associated with Parkinson's disease can be noticed. If the mentioned impairments happen in a part of the brain that controls cognitive function, symptoms of Alzheimer's disease can be observed. If the disorders are in a region of the brain that regulates the mood, symptoms related to depressive disorders may appear.

Depressive disorders can cause cognitive dysfunctions, metabolic disorders, sleep and appetite disorders, behavioral abnormalities, and mood changes due to impaired blood flow to the brain (Roose & Sackeim, 2004). According to Smith (2018), people with depressive disorders also have symptoms such as losing interest in activities that were once fun, having difficulty making decisions, and inability to be in an energetic mood. It is likely that elderly people with such condition are not nearly as active as they once were in a previous period of life. Sadly, this type of inertia would eventually affect the spatial use for an elderly person, possibly resulting in an unhealthy level of isolation. Such isolation is a situation to be avoided, especially if an elderly person is suffering from inertia.

4. Social and Emotional Changes in Old Age Regarding Human–Space Relationship

The effects of physical and cognitive changes that occur in the aging process can be traced in various social and emotional problems. For instance, as a result of previously or currently faced physical changes, elderly people can no longer be as active as they used to be, which causes difficulties in participating in social life and receiving much needed emotional support. Likewise, one possible reason for not being able to participate in social life is, not being able to navigate independently due to cognitive changes. Also, as a result of various losses, an old person could experience decrease in work efficiency. Such decrease could possibly force retirement, which paves the way for the role and status changes in the society. In short, elderly people are likely to face diseases, crises and stress, retirement and adjustment to post-retirement life, changes in social status, loss of spouse and loneliness as life progresses (Savi Çakar, 2018). These matters may deeply affect the life of the elderly, thus lead to social and emotional changes in life.

There are a few trends that elderly people can adapt to in order to overcome the social and emotional deficits, such as active aging and aging in place. Both lifestyle alternatives promise support for elderly people's adaptation to experienced issues.

Most older people resist the idea of leaving home although the physical decline and loss of certain abilities are clearly visible (King & Johnson, 2002). Because aging in place means being able to live in an environment that elderly people belong to, and which has an impact on their own identity (Lanspery, 2002). A home and its close surroundings are a source of physical and psychological comfort, support and happiness for the people of old age (Arpacı, 2013). "Aging in place" can be summarized as a way of getting involved instead of being isolated for the elderly. Yet in order to house an elderly person in a familiar environment, that environment must be designed with special awareness and needs to be augmented with proper equipment.

Secondly, active aging enables people to reach their potential regarding physical, cognitive and social well-being throughout the late stage of their life. It allows the elderlies to be a part of society to meet their needs while receiving adequate protection, security and care when needed (W.H.O., 2002). Active aging is not only related to the prevention of social isolation and ensuring emotional well-being, it also promotes autonomy and independence. A person who adapts to this idea is likely to possess a suitable mindset for being able to find new hobbies, or jobs even after being retired. Supporting oneself physically and mentally would enable many positive developments, such as protecting one's strength, joint health, weight, cardiovascular health and



cognitive wellness. Yet, an elderly person needs to be within suitable conditions to adapt to such lifestyle, including encouraging environments and non-intrusive spatial arrangements.

Similar to aging in place, active aging is not an easy task for every elderly person. There are several conditions and factors that can restrain the individual to engage in activities in an autonomous and independent manner, such as health issues, inadequate support, anxiety, and many more. However, with the help of suitably designed and well-equipped environments, elderly people can be encouraged to enhance their own lives. Such environments can be created with the help of current technological advancements, in harmony with a knowledgeable and sensible design mindset. Thanks to technological devices and systems, such interiors that can provide emotional, social, cognitive, and physical support can be designed and built for the elderly.

5. Impact of Smart Homes on Life Quality of the Elderly

As stated previously, elderly people experience problems adapting to their environments, which are most likely interiors (their homes to be specific). Consequently, they are confronted with abandoning their homes in order to meet their care needs. However, the problems of adaptation are not unheard of throughout the historical process of human beings. Whenever people were subjected to the harsh and wild conditions of nature, they responded by using their cognitive capacities, inventing tools that we now consider as the technology of that era (Yıldız, 2014). Throughout the course of history, people have resorted to technology in order to accomplish what they could not achieve naturally. Therefore, it is only reasonable for the elderly to take advantage of technology in order to overcome the problems they experience.

Smart homes are one of the key subjects when technological advancements meet interiors and spatial arrangements. A "smart home" can be defined as a house equipped with computers and information technologies that anticipate and respond to the needs of its users. Smart homes are living spaces that have the capacity to provide comfort, convenience, security and entertainment to their users using technologies inside and beyond the house (Aldrich, 2003). As an application of Mark Weiser's "Ubiquitous Computers" concept and based on the "Internet of Things" technology; smart homes are the houses that have become "smart" in terms of comfort, health, safety and energy saving thanks to the invisible communication of all devices within (Alaa et al., 2017; Alam et al., 2012). Besides its roles in practicality and convenience, smart homes possess a massive potential in reducing the disadvantages caused by various physical, cognitive, social and emotional changes.

For example, falling/collapsing for various reasons has a high prevalence in people aged 65 and over. Falling is one of the reasons for the decrease in physical activity, the decrease in the quality of life, increased depression and the increased possibility of being placed in a nursing home (Tomita & Nochajski, 2015). It is important to augment the space with such technologies that can help prevent and overcome falls (Nawaz et al., 2014). A smart home equipped with locally networked sensors will be able to measure and analyze various physical activities such as footprint, and gait / posture information. Obtained data can also be used to evaluate the activity and health status of the elderly (Lee et al., 2009). Thus, it will be easier to recognize physical accidents, act quickly and minimize unwanted results. Moreover, the mentioned data could be gathered without visually recording and violating the private life of an elderly person. An elderly person's privacy should and can be respected with the correct combination of sensors, spatial settings, network and software.

Yet, due to cognitive impairments, people may have some difficulties during an indoor activity. As stated previously, an elderly person that has cognitive impairments might not be aware of the current location, not be able to pay attention, lose the sense of memory,



not be able to maintain physical control, and show signs of behavioral disorder. All these problems require an authorized person to monitor and control the indoor activities of this individual. However, it is not always possible for family members or authorized personnel to accompany the elderly, nor it is respectful in terms of privacy. Fortunately, smart homes can be a help in such situation and provide assistance for people with dementia or similar diseases. Smart homes contain a combination of interrelated software and hardware components that can understand one's behavior and activities. Thus, smart home systems can detect risky situations and perform a variety of actions to promote an autonomous and independent life for the elderly (Amiribesheli, Benmansour & Bouchachia, 2015; Amiribesheli & Bouchachia, 2015).

Thanks to the possibilities offered by smart homes, various behavioral disorders can be monitored and identified as well. Pressure sensors placed on beds, seats, floor or similar interior elements can provide valuable information about the person's condition (Mertens & De Maesschalck, 2015). Symptoms such as inertia, reluctance, and stagnation can be clues that the elderly person is in a depressed state. Again, with the data provided by sensors, conditions such as constant inertia can be detected without videotaping and violating elderly person's private life. Accordingly, the needs of the elderly person can be recognized, and steps can be taken to meet such needs.

With smart homes, elderly people's care needs can be met remotely if deemed necessary. Thus, it will be possible to provide comprehensive care for elderly people while they continue to live in their own homes. In this way, older people can be supported both socially and emotionally, and can continue their lives in an active physical and cognitive manner. Thereby the quality of their lives can be increased, and they can continue to age both independently and autonomously.

In short, a smart home is not just an interior equipped with a technological ecosystem. For elderly people, it is a combination of solutions that can reduce the dependency caused by being exposed to various losses. For people of old age, smart homes are likely to provide a sense of control and care, while making life easier and better in terms of quality. Elderly people would easily have a high quality, autonomous and purposeful life if their specific needs were properly analyzed and matched with functional, aesthetically pleasing, meaningful and technologically augmented spatial solutions.

6. Definition of Interior Design and its Role About the Subject Matter

"We shape our buildings; thereafter they shape us", as said by Winston Churchill, stands as a very well-known and accurate statement regarding human-space relationship. As mentioned, importance of environments and interior spaces are one of the key components that shape how a person lives. However, it is impossible to think about different environments/interiors and not to mention how and by whom such defined spaces were designed. Designers such as architects, interior designers, industrial/furniture designers, landscape architects, city planners and many more people from different design professions contribute to the formation of spaces which shape people's lives. Yet even though various design professions have a large amount of contribution concerning how people live and spend time while indoors, interior designers are specifically trained and experienced in said area.

To begin with, there is an ongoing uncertainty in the country where this research was held (Turkey) regarding the official name and definition of interior design profession. Even though the Turkish term for the profession '*iç mimarlık*' is a direct translation of 'interior architecture', interior design and interior architecture translations are often synonymous and are used interchangeably. Though two occupations differ by slight details, the profession (as applied in Turkey) often covers tasks and responsibilities of both.



This difference is also present in International Labour Organization's International Standard Classification of Occupations' definitions. Lead statement of Interior design is as follows: "Interior designers and decorators plan and design commercial, industrial, public, retail and residential building interiors to produce an environment tailored to a purpose, taking into consideration factors that enhance living and working environments and sales promotion. They coordinate and participate in their construction and decoration (I.L.O., 2012)". Tasks of an interior designer are also defined as:

- (a) determining the objectives and constraints of the design brief by consulting with clients and stakeholders
- (b) researching and analysing spatial, functional, efficiency, safety and aesthetic requirements
- (c) formulating design concepts for the interiors of buildings
- (d) preparing sketches, diagrams, illustrations and plans to communicate design concepts
- (e) negotiating design solutions with clients, management, suppliers and construction staff
- (f) selecting, specifying and recommending functional and aesthetic materials, furniture and products for interiors
- (g) detailing and documenting selected design for construction
- (h) coordinating the construction and the decoration of interiors
- (i) designing and painting stage scenery;
- (j) designing and decorating show windows and other display areas to promote products and services; (I.L.O., 2012).

Yet, in International Standard Classification of Occupations it is stated that interior architecture is a separate but related occupation. Interior architecture could be found as a branch under the building architects occupation in said publication. Though architecture and interior architecture is distinctly different, following tasks are mutual between the two occupations:

- (c) providing information regarding designs, materials and estimated building times
- (d) preparing project documentation, including sketches and scale drawings, and integrating structural, mechanical and aesthetic elements in final designs
- (e) writing specifications and contract documents for use by builders and calling tenders on behalf of clients
- (f) making necessary contacts to ensure feasibility of projects regarding style, cost, timing, and compliance with regulations.;
- (g) identifying and finding best solutions for problems regarding function and quality of interior environments of buildings and making necessary designs, drawings and plans;
- (h) monitoring construction or rehabilitation work to ensure compliance with specifications and quality standards.
- (i) maintaining technical liaison and consultancy with other relevant specialists; (I.L.O., 2012).

As I.F.I. (International Federation of Interior Architects / Designers) specifies, the profession of interior design requires the acceptance of key responsibilities, such as creatively solving problems pertaining to the function and quality of the interior environment, performing services including design analysis, space planning, inspection of work on site, using specialized knowledge of interior construction, equipment, materials and furnishings. An interior designer is also required to prepare schematics, drawings and documents relating to the design of interior space in order to enhance the quality of



life and protect the health, safety, welfare and environment of the public ([http-9](#)).

Lastly, E.C.I.A. (European Council of Interior Architects) published a revised version of European Charter of Interior Architecture Training and the following definition was included: "The interior architect profession acts as an agent in creating the world around us and specializes in producing aesthetically appropriate, compelling and successful spaces. The field of practice is to understand human needs and wills in relation to atmosphere, security and well-being with the responsibility for the future of the environment (E.C.I.A, 2020)".

In short, an interior designer/architect is a person who is professionally trained to create aesthetically pleasing, functional, convenient, and meaningful environments along with other competences, such as analyzing users and interiors in detail, possessing knowledge about construction and documentation processes, regulations, materials, and furnishing. Being a user-centered profession, interior design promises tailored living spaces for individuals who are in such need.

Considering each elderly person's probability of having a unique set of losses and disadvantages, a tailored living space is a requirement for a healthier, happier and a more successful life. Rather than attaching several extraneous technological items to dysfunctional interiors, creating tailored spaces as well as augmenting the interiors with compatible and non-obstructive technologies promises elderly people much preferable outcomes.

Being able to combine purposeful digital technologies seamlessly into interiors requires more than selecting which several objects fit together visually. An interior designer, other than being competent regarding human-space relation and organization, is also expected to have an adequate understanding towards digital technologies. Though not including to possess a comprehensive knowledge regarding how individual technologies operate, interior design is a profession that requires tendency and literacy towards digital technologies as part of designing, presenting and construction processes. For instance, interior designers are expected to be competent in prototyping, which requires the understanding of machine-to-machine communication processes through the use of 3D printers, CNC routers, and laser cutters. Also, C.A.D. (Computer Assisted Drawing) programs, which operate through typing or selecting commands in order to generate the desired outcome, are considered as standards for design communication and presentation. Also, owing to being capable of using several other computer programs such as image rendering and reality simulating, image and video editing, word processing and spreadsheet softwares, an interior designer is expected to have a familiarity regarding program interfaces and digital problem solving/troubleshooting. To add more, being knowledgeable regarding interrelation and harmonization between various different objects presents advantages to interior designers in respect of analyzing, planning and seamlessly applying technological products and systems into well-designed interiors. The abovementioned qualities of interior designers match with the requirements and responsibilities that are needed in order to create well-designed and purposefully enhanced spaces for elderly people.

DISCUSSION

Providing high quality living conditions for elderly people becomes more and more important in time, as the current situation of world's population increasingly requires so. Fortunately, technological advancements are quite helpful for such purposes. An elderly person's life quality could be significantly enhanced if comprehensive, user-centered design and relevant technological equipment are successfully integrated. Briefly stated, in order to create the best living conditions for an elderly person, each disadvantage should be analyzed and resolved in a detailed, knowledgeable and purposeful manner. Likewise, an individual should feel valuable, comfortable and productive in one's own



living space. An interior space could be difficult to live in –or may even be impossible to tolerate– if it is not arranged/ designed properly. The living space for an individual (an individual's home, for instance) should fulfill various functions such as being aesthetically pleasing, functional, convenient, and meaningful specifically for the user/s. Only then, the individual would truly benefit from the environment and efficiently use the space. Otherwise, individuals could potentially face various difficulties while fulfilling indoor tasks efficiently, such as experiencing difficulties to appreciate the environment, to feel accepted in the space or to feel a reason to stay in. Fortunately, interior designers either do possess or have the specific skillset to acquire the knowledge about users and their relationship with their environment. Thus, suitable environments and living arrangements could be professionally and precisely designed for anyone, and further be augmented by smart technologies for enhanced function.

Though nowadays, purchasing "smart home" products are easy enough that, let alone having a detailed understanding regarding digital technologies, even going to a store is not required for such action. But even though technological equipment might be added to an interior, it would not compensate for the non-user-friendly, obstructive, limiting and unmeaningful properties of the living space. Also, anyone (especially elderly people) should not be forced to use, or to live with technology without proper organization, as people might be afraid of or skeptical about technological devices in the first place. Technology should accompany sensible, comprehensive and meaningful design, only then the maximum function and satisfaction would be achieved.

In conclusion, interior design/architecture as a profession requires being professionally trained in analyzing and matching people's needs to spatial solutions as well as being familiar about current and future advancements, such as new and emerging technological products, systems and services. Interior designers, given the qualities and specifications they possess, are likely to provide the best skillset, mentality and precision in regards of creating the ideal living arrangements not only for elderly people, but also potentially for anyone.

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