

Design urban area toward aging successfully; based on Kansei methodology

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Abstract: As globally demographic changes because of increasing life expectancy, concern about prompting greater health in old age is becoming more important. Trend shows by next three decades about 25 percent of living people are age 65 or older. Different researches has tried to define healthy aging factors objectively like 'successful aging' which divided aging well into three different components; physical health, social engagement and psychological health but when we look at this criteria subjectively there is no specific method to discover elder's psychological desires. In this paper we used Kansei theory as method to define elder's psychological needs to design built-in urban environment. As with the case for this study we choose a group of old male and female Iranian elders as participant in to understand their aesthetic, emotional, and other experiential factors which leads to design facilities and surrounding toward aging successfully and offer a framework about our target group needs, based on Kansei methodology.

Keywords: Kansei methodology, Successful aging, urban design, Iranian elders

1. INTRODUCTION

Since demographic shifts internationally because of dynamics of an aging population, decreasing fertility rates, shrinking household size and growth in developed countries resulting from net immigration, more and more attention has been paid toward people who step in old age and different studies and questions addressed by gerontologist and researchers to deal with this problem to find solutions that result more respect to older adults and their environment (Colangeli, 2010). Elderly-friendly environments and equipment's toward successful aging are those designed with the elderly's physical and psychological characteristics in mind of the elderly (nakayama & morimoto, 2007). Different methods of design process have been conducted to discover real users' needs and desires especially in psychological background and Kansei engineering is one of the most successful ones. Kansei Engineering is a technology that translates user's psychological feeling into design specifications (Nagamachi, 2008). In design based on Kansei, qualitative information which is gained by interview and observation will be translated to quantitative information.

The purpose of this paper is to explore criteria of successful aging in urban public spaces base on

Kansei engineering methodology. First three aspects of physical, psychological and social defined and detailed then to address the importance characteristic of each mentioned context, Kansei engineering methodology applied.

2. DEFINITION OF SUCCESSFUL AGING

2.1. Objective and subjective definition of successful aging

The term 'success' in gerontology has generally been tied to the ability of health care providers to treat illness and disease and restore functioning that is developed by Rowe and Kahn (1997) into the most popular model in aging studies which titled was as 'successful aging'. They define idea of successful aging as a low probability of disease and disease-related disability, high cognitive and physical functioning and active engagement with life (Figure1). They believe "successful aging is more than absence of disease, important though that is, and more than the maintenance of functional capacities, important as it is. Both are important components of successful aging, but it is their combination with active engagement with life that represents the concept of successful aging most fully". Additional meanings emerging from the concept of 'success' includes; positive functioning or psychological well-being (Morgan, et al., 1991; Sullivan & Fisher, 1994), physical and mental health (Meeks & Murrell, 2001), cognitive growth potential (Stern & Cartensen, 2000), high quality of life (Yoon, 1996), high life satisfaction (Meeks & Murrell, 2001), adaptation to life changes (Abraham & Hansson, 1995), and social integration (Seeman et al, 1995).

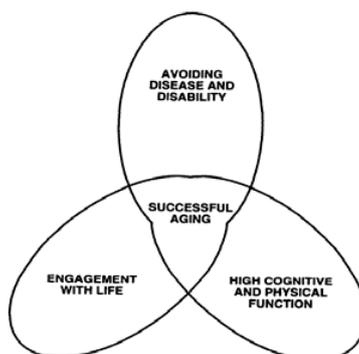


Figure 1: A model of successful aging (Row & Kahn. 1997)

Existing models of successful aging have each received criticism for not fully recognizing the multidimensionality of the concept and not considering the influence of broader social structures including the allocation of resources and opportunities, cultural contexts, and norms and behavioral expectations (Ryff & Singer, 2009). Jordan (2010) believes; "the current successful aging model of Row and Kahn(1987) was developed by non-elders and non-minorities, but it has been applied to the elderly population as well as minority elders; as a result, this model does not take into consideration the unique characteristics and circumstances of ethnic minority elders"(Jordan,2010). Strawbridge and Wallhagen (2003) have criticized current conceptualizations for their failure to acknowledge and incorporate layperson perceptions and experiences of successful aging. For example, In a study by von Faber and colleagues (2001), 81.5% of the subset of participants who took part in the qualitative interview felt they were aging successfully however, only 10% met the researcher's criteria of successful aging defined as a state of optimal overall functioning (physical, social, psycho-cognitive) and well-being. Participants generally viewed success as a process of

adaptation, valuing well-being and social functioning more than physical and psycho-cognitive functioning (von Faber et al, 2001). Subjective measures of successful ageing are lay views, or those which are defined by older individuals themselves (Farina, 2009). Advocates of subjective measures argue that objective criteria fail to incorporate older individual's views of how successful ageing should be classified (Hilton, Kopera-Frye, & Krave, 2009). A subjective rating was most commonly obtained using a ten-point Likert scale ranging from least successful to most successful (Vahia et al., 2010). Most important elements that have been identified subjectively by older adults themselves include: longevity, absence of disease, freedom from disability, independent functioning, good cognitive functioning, life satisfaction/well-being, mastery/growth, positive adaptation, personality traits, social/productive engagement and environmental factors (Phelan & Larson, 2002).

2.2. Aging successfully and environment

2.2.1 Ecological model of aging

The outdoor environment offers great opportunities for older people to be physically active, to have contact with nature and to meet with friends and neighbors (Sugiyama, W. Thompson. 2005). To expand the importance of perspectives in the field of the ecological and environmental factors on successful aging and well-being Lawton and Nahemow's (1973) suggested the Ecological Model or competence-press model that is based on three concepts dealing with persons, environments, and the relationship of the two (figure 2).

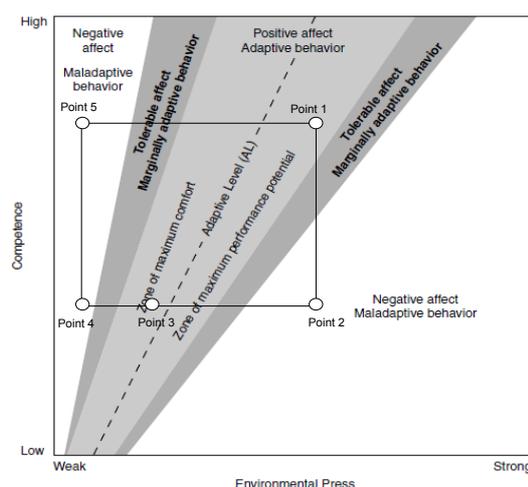


Figure 2: Lawton and Nahemow's Press-Competence Model

In competence-press model the ability of a person to function independently is represented by the vertical axis (competence) which includes physical, mental weakness and includes physical and emotional qualities. The degree of difficulty associated with the built environment (Environmental Press) is represented by the horizontal axis. As a person deals with changes he or she can take different positions in the ecological model. Point1 shows a position of satisfying the match between the press of environment and personal competency. Point 2 shows a position of a less satisfying match between the same environment and personal competency (less independence due to illness or some accidents). Point 3 shows a position with lower press from the environment (which is a different place where more assistance is provided). Point 4 shows a position where the environment

is providing too much care (nursery, hospital, etc.). Back to the level of functional competence (convalescence from an accident or an illness), a person can pass to point 5, providing low environmental press. When this low press becomes unsatisfactory, the person can move back to point 1 (Regnier and O. Byerts, 1983).

Further studies by considering the ecological model, emphasize the important role of urban environments on older people overall health. Bowling et al. beliefs elder's engage with outdoor environments from three different types of process; (1) participation in outdoor Physical activity, (2) exposure to outdoor natural elements and (3) social interaction with friends and neighbors in outdoor places (Bowling et al, 2003). In the dimension of social environment, the urban area furnished the elderly with abundant activities and brought a positive influence on their mental and cognitive health. In the dimension of physical environment, urban areas supplied distinct types of leisure facilities and equipment, which influenced the elderly's physical, mental and cognitive health, and their social relationships. Finally, in terms of the natural environment, the surroundings improve the relationship and coherence between peers (Lin and sakiuno, 2012).

3. KANSEI ENGINEERING

Different methodologies have been developed to integrate emotional/intangible/inexplicit needs into product concept design among these methodologies; *Kansei Engineering* (KE) is that using a strong-structured process for analyzing unexpressed and unconscious needs of consumers and for translating such needs into the design domain (Nagamachi, 2008). According to Nagamachi, "*Kansei is the impression somebody gets from a certain artefact, environment or situation using all her/his senses of sight, hearing, feeling, smell, taste as well as their recognition*" (Nagamachi and Matsubara 1997).

3.1. Overview of definitions of Kansei

Akira Harada who was firstly tried to define concept of Kansei in 1998 (Harada 1998). Looking for a comprehensive definition of *Kansei*, Harada collected definition of the word *Kansei* provided by about 60 researchers involved in the research related to *Kansei*, and analyzed the responses statistically. Figure 3 shows the resulting graph of the cluster analysis made on the keywords output from researchers' answers.

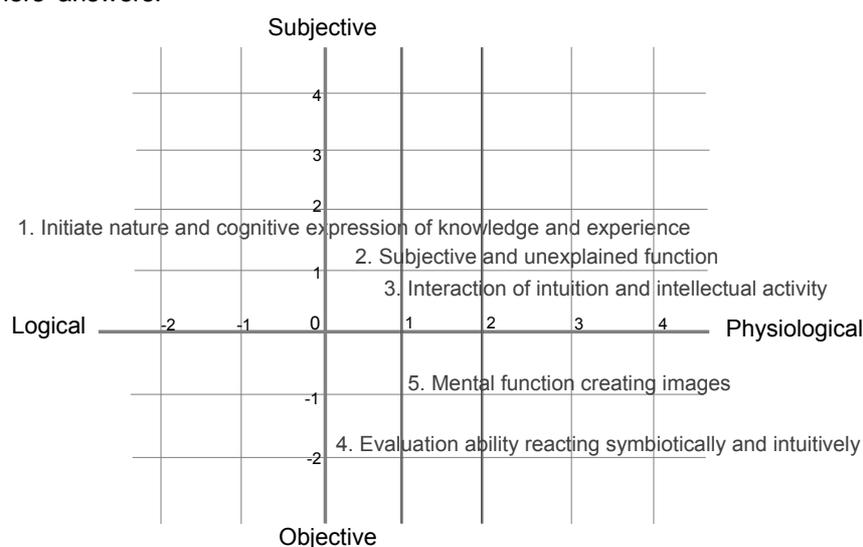


Figure 3: Scatter Graph of Keywords of *Kansei* definition (Harada 1998)

The axis X (axis 1) is interpreted as a logical-psychological axis and the axis Y (axis 2) as a subjective-objective axis. This proposition shows a multi-dimensionality of *Kansei* and is composed of multiple elements such as ‘subjectivity’, ‘expression of the inner (knowledge and experience)’, ‘intuition and intelligent activity’, ‘reacting toward external stimuli’, ‘reflective images’. According to Harada, *Kansei is an internal process (a high function) of the brain, involved in the construction of intuitive reaction to external stimuli* (Lévy, Lee and Yamanaka, 2007). Harada (2003); proposed to describe *kansei* as “an internal process (a high function) of the brain, involved in the construction of intuitive reaction to external stimuli.” During the same period, Nagamachi (2006) describes *kansei* as an “individual’s subjective impression from a certain artifact, environment, or situation using all the senses of sight, hearing, feeling, smell, taste as well as recognition.” While Harada describes *kansei* as a process, Nagamachi describes *kansei* as a result of this process. Harada goes further to list three major characteristics of *Kansei* as; 1) human expression based on added knowledge and experience to inborn dispositions; 2) the ability to react to and evaluate external stimuli intuitively; and 3) the interaction of intuition and intelligent activity (Harada, 1998).

4.METHODOLOGY

The research method has been designed in order to provide environmental paradigm which governs the value of public space from the perspective of elderly people in Tehran for participation, being active and social interaction. The population for this study included all residence aged 65 and older who participated in public places in Tehran.

To collecting require data Totally 20 elders were asked to participate in questionnaire to evaluate the importance of each *kansei* words in the process of design urban environments and inside equipment’s. The experiment was conducted in three central parks of Tehran (Laleh, daneshjo and Honarmadan Park) where the population of elderlies is noticeable. Data for this research was collected during 1month, from middle of December 2013 until January 2014.

The procedure to assess environmental emotional quality by KE in this research schematized into five different phases; (1) Exploration of the physical, psychological and social properties dimensions of urban environment to identify appropriate *kansei* words; after few filtering in this research, 30 *kansei* words are collected toward define cognitive and emotional bond between users and the environment under study, (2) Construct of five-point SD (semantic differentials) scale is constructed to evaluation the importance of each word, (3) Collection of users’ impression according to the identified words in first phase, (4) Analysis of the collected data for predicting how strong the different environmental elements are related to the users’ emotional response; and (5) Definition of the new outdoor environment development strategy according to the results of the analysis made in phase4.

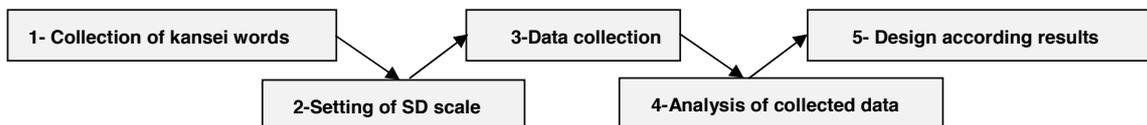


Figure 3: Flow of *kansei* methodology used in research

The 5-point constructed SD Scale was included 30 *kansei* words in total as shown in Table 1, which divided into 3 aspects of physical, psychological and social dimensions. Selection of these

words was according to importance and repetition of them in earlier research in the field of design and successful aging.

Table 1: List of Kansei words for SD scale

Physical dimensions	Psychological dimensions	Social dimensions
Barrier-free	Pleasure	Collaborative
Flexibility	Understandable	Encouraging
Accessibility	Natural	Democratic
Dynamic	Informal	Friendly
Supportive	Attraction	Competitive
Simplicity	Modern	Respectfully
Functional	Security	Unity
Masculine	Lively	Inviting
Fun objects	Relaxation	Controlled
Curved	Symbolic	Arranged

In exploring these words behaviors and activities of elderly in urban public spaces have been affected. These words were explained in such a way that firstly the elderly be familiar with them secondly in elder mind, significant mental image of these words exist.

5.RESULTS AND DISSCUSION

Demographic characteristics of participant in this study were evaluated with the Microsoft office excel 2010 software. In this study 35% of participants were women and 65% were men. Also 45% of sample were aged lower than 65 years, 40% between 65 – 75 years and 15% were 75 years and older.

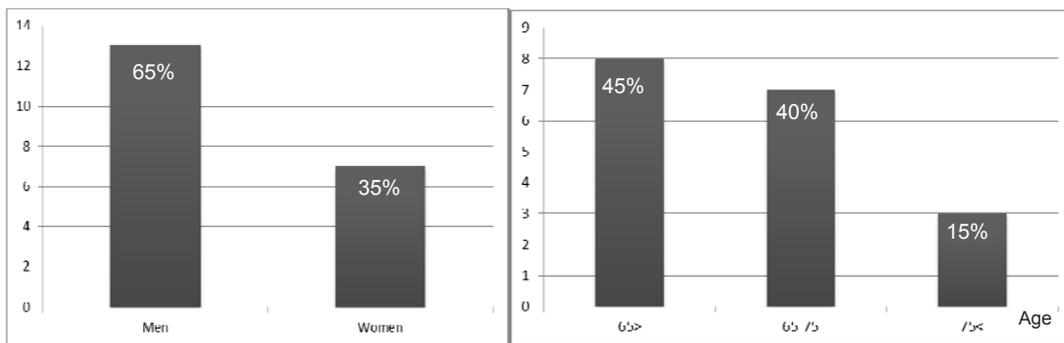


Figure 3: Demographic evaluation of Elders participant in research

The success of KE is mainly due to its systematic procedure by which it is possible to determine the “quantitative” relationships between users’ emotions and feelings of and product elements (Nagamachi, 1995). In this research by categorize the quantitative expression of elder’s feeling about urban environment in three columns of physical, psychological and social we aimed to

understand importance of components of each group. After collecting data from interviews all data were entered in Excel and then scoring and weighting of each factor which showed in the final result. Due to analysis of social keywords related to success of elders respectful treating, arranged and inviting environments are most important. For physical dimension we found several factors in same level of importance but factors like accessibility in use, being supportive were more bold and finally most relative dimension toward psychological dimension were feeling relaxation, safety and natural. In figure 4 the importance of each factor toward participation rate of elderly in urban green places of Tehran have been shown.

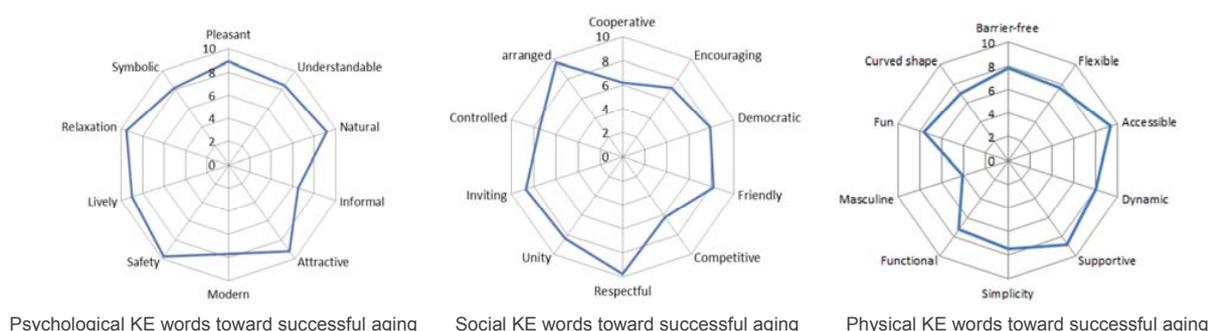


Figure 4: Kansei words related toward aging successfully in urban area

According to the results of research from mentioned 30 Kansei words toward aging successfully we arranged 16 of them from all categories as the most important factors that received point 8 from total number of 10 (table 2).

Table 2: List of 16 selected Kansei words for aging successfully in urban green places

Selected Kansei words	Value	Description
1- Safety	9.8	Urban spaces should have the condition of freedom from danger, risk, or injury
2- Respectful	9.7	Environments should characterize by or showing politeness or deference
3- Arranged	9.7	facilities in parks should planned toward specific order
4- Relaxation	9.5	Details should design for Refreshment of body or mind
5- Accessible	9.4	Urban space should be easy to approach, enter, use, or understand
6- Natural	9.2	Facilities should being related in, or produced by nature
7- Attractive	9.2	spaces should appeal to the senses or mind through beauty, form, character
8- Lively	9	Public space should be full of life or vigor
9- Pleasant	8.9	Environments should be toward elders enjoyment and agreeable
10- Supportive	8.8	Equipment's should Furnished to support or assistance
11- Inviting	8.7	The Attractiveness of the urban place should be significant
12- Understandable	8.5	Spaces should be Expected or accepted under the circumstances
13- Unity	8.4	harmony or concord between different details of urban area
14- Friendly	8.2	Urban environments should be warm and comfort
15- Symbolic	8.2	Using symbolism in design urban details

16- Dynamic	8	Urban places should concerned with energy or forces that produce motion
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7.CONCLUSION

Aging is a phenomena in new days and make a lot of challenges for society. For increasing quality of life in the society, we have to work on successful aging. One of the best ways to understanding about users' feelings is kansei methodology. In this study Kansei Engineering was used to recognize elder users' needs toward successful aging in public urban spaces and applying these needs to environmental properties. According to the study and findings seems, recognition and understanding of elders needs in urban places and trying to response these needs and respecting their preferences in the design and optimization of urban public space can be improve the quality of life and life expectancy of elders which contributes successful aging for them. The result of the study showed that from the elders people viewpoint totally 16 characteristics of urban public places were most important to experience successful aging from 30KE words that firstly were selected.

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