

The kitchen supply design based on Kansei engineering study for the elderly user of independent

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Abstract : The world's elderly population (Age over 60 years) rapid rise and to 22% of the total population and will more than children (under 15 years) population in 2050. The world Health Organization (2002) Active Aging concept, Promote the importance of maintaining the autonomy and independence of the elderly clarify. This study used inductive method such as lifestyle population surveys, focus group interviews, Kano model, and QFD (quality function deployment). The results show that important for having independent living for to study the possibilities of designing kitchen supply for the independent aging. The most important design elements for elderly using kitchen supply are to have the anti-hot pot body, fast heat conduction, heat dissipation, no slip handle, lightweight and easy to pick up, and in line with the hand.

Keywords: QFD deployment matrix, elderly user, independent living, active ageing, kano model

1. INTRODUCTION

1.1 Background

The aging population of the global is growing. According to United Nations, that the estimated global elderly population in 2045 for the first time beyond the children (under 15 years) population. This trend will produce huge social and economic burden, and have to be early to responded. Many studies have confirmed that with independent living and regular physical activity can bring many health benefits. Effective physical activity to enhance the functionality of the elderly daily life, health, fitness and quality of life are of great help and also achieving pleasant living (Ming-Jen Yang, 2010). According to the concerned areas of research (including health, economic independence, the degree of independent living) it is also that founding elderly user living independently more positive attitude, the higher the degree of independence of living persons, higher life satisfaction (Lin Yi-shan, 2007).

1.2 Research purposes

This study aim is to promote the autonomy and independence of older people to maintain life, and the use of resources in the central region of the metal industry, the development kitchen supply of the elderly user. By kitchen supply research to improve the motivation of the elderly cook, help the elderly to live independently with dignity, and both self-maintenance and body healthy daily diet, creating a sense of pleasure and happiness. Also, the metal industry in central Taiwan for the vehicle, This study may change the traditional manufacturing and design thinking, then, increase sales target customer groups, enhance economic output, increasing company profits, and build their own brand in Taiwan.

2. LITERARY REVIEWS

In order to create and give elderly user that a satisfactory and enjoy life for kitchen supply design, Our research to find out from the literature with the "independent" about the elderly population and comprehensive of the all kinds of researchers definition lifestyle are summarized in Table 1. Overall, the life style is defined scope from the study of human habits, life, behavior, culture, etc., and to make inferences and classification of different ethnic approach.

AIO dimensional types more suitable for applications in large-scale surveys and quantity, and also the most widely adopted by most researchers approach. AIO Scale is divided into: (1) general lifestyle, and (2) certain of the lifestyle scale (Engel et al, 1978.), our study used the first general lifestyle scale, to overall understanding of elderly user in general lifestyle. Reynolds & Darden (1974) considered lifestyle (Table 2), including: (1) Activities (activities), (2) interest (interests), and (3) comments (opinions), but each study is bound to contain all the variables, so our study, depending on their research projects to select, filter or change variables needed. Our study was designed to classify the objects that meet "independence" ethnic characteristics, to serve as future visit. Taiwan in recent years, researchers measured using AIO for elderly user in various lifestyle which summarized in Table 3.

Table 1: Lifestyle definitions

Researcher	Definitions
Mei-Ling Yeh (2007)	Lifestyle with the residents or consumers grouping characteristics, and can reflect the specific behavior of individuals and ideas
Hawkins, Best, & Coney(2001)	Person's lifestyle is the concrete manifestation of the concept of self-caused, through past experience, inner thoughts and the prevailing situation, produce the combined effect of these three
Engel, Blackwell, & Miniard(1995)	Lifestyle is a form of human life and spend time and money, reflecting the activities undertaken by individuals, ornaments and opinions on various topics of interest.
Kotler(1991)	Lifestyle is to describe the situation of personal interaction with the environment
Assael(1987)	Proposed lifestyle is widely defined as a way of life, and this mode can be three ways to identify, has also become the main basis AIO scale: (1) how people use their time (activities); (2) What is their living surroundings of the important things (interest); (3) their perception of themselves and those around them (opinion)
William Lazer(1963)	Lifestyle is a system concept, is a group on the life and consumer has the characteristics to explain differences in the groups with other groups, so the lifestyle is the sum of culture, values, and legal forces caused
Kelly(1955)	Lifestyle is a person's cognitive architecture, rather than the social system, because everyone has their specific cognitive architecture, because everyone has a particular lifestyle.

Table 2 : AIO lifestyle Scale

Dimensions	Definitions
Activity	Refers to a specific and distinct activities can usually be observed directly, however the reason it is difficult to directly measure
Interest	Refers to certain things, events or topics excitement level that allowing people to produce special and sustained attention
Opinion	Refers to the individual in question puncture under certain situations shock reaction, given oral or written statements, can be used to describe a personal explanation for things, expectations and assessments

Source: Reyonlds & Darden(1974)

Table 3: elderly user in all facets clustering literature review

Researcher	Topic	Clustering name
Zeng Bo Xun (2008)	Research retirement lifestyle satisfaction with the use of the park	Interest orientation Independence Leisure Leader
Wang Pei-Yun、 Su Ja-Cho(2006)	Research using adult lifestyle relations with the media	Feeling of supremacy Self-centeredness Aggressive
Zhang L, Chen Guang-hua (2006)	Research elderly buying behavior Long-term care market in Taiwan	Traditional and conservative Aggressive Optimistic attitude to life
Liu Yan Ying, Wang Hui Xuan(2005)	Research middle-aged care retirement community for coherent attitude in the city	Opening and focus on brand Conservative, traditional and diligence Emphasis on health and not care substance Optimistic attitude to life
Guo zheng-De	Research seniors participating leisure, lifestyle factors and obstacles	Emphasis on the family Self calm Information access Self requirements

3. RESEARCH METHODS

Our study used four kinds of research methods include: (1) lifestyle scale, (2) Kano model (Figure 1), (3) QFD (Figure 2), and (4) focus group interviews. Products are metal products industries with growth potential in central Taiwan, while setting the kitchen supply as subjects and setting target customers over 65 years old, with an independent features in Taichung, Taiwan. Contents divided into several stages, the step shown in Figure1.

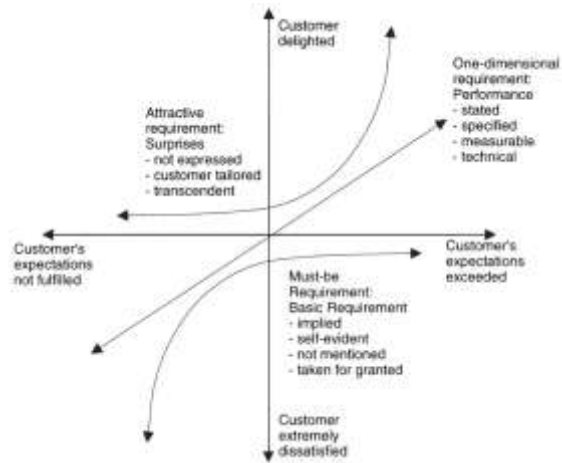


Figure 1: The Kano model of customer satisfaction

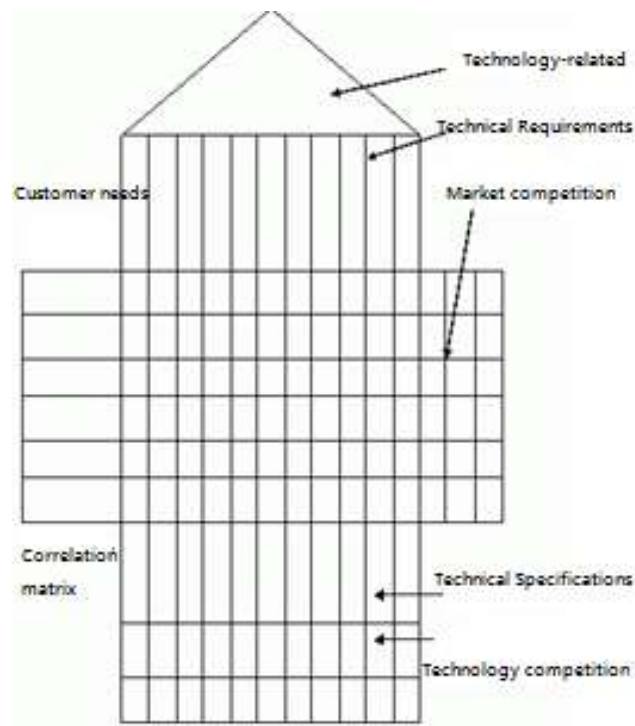


Figure 2: Schematic QFD

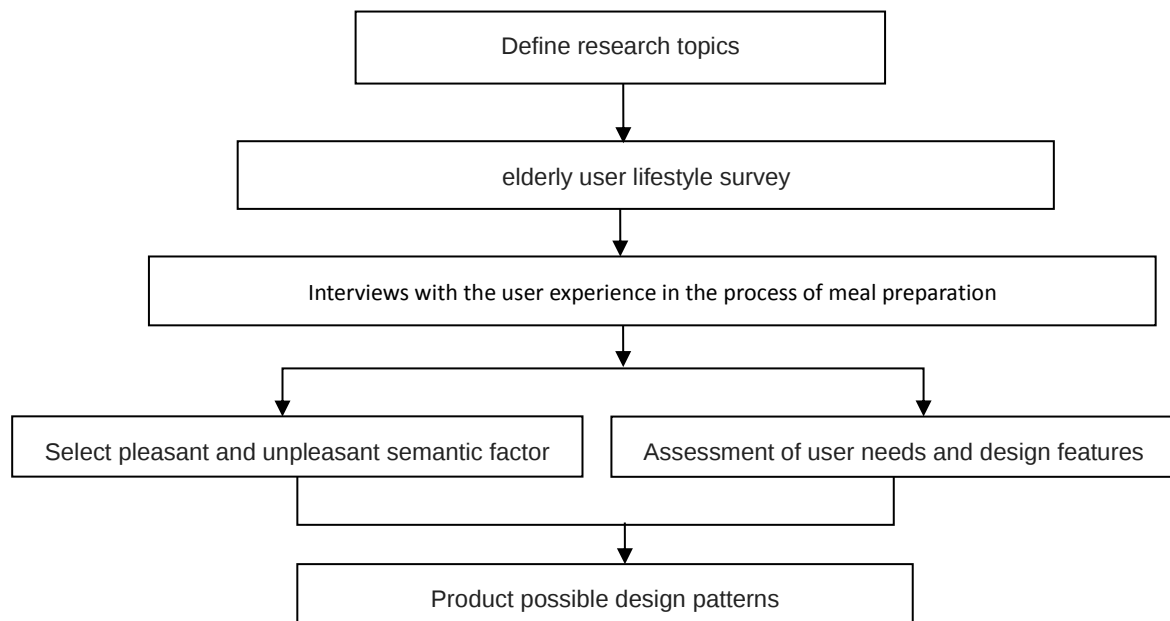


Figure 3: Research Steps

4. THE FINDINGS

Based on the number of people over the age of 65-74 (Table 1) for the 140,987 people in Taichung City. Experiments taken calculate 95% confidence lower (error is 5%). This study distributed 384 questionnaires that using Internet questionnaires and paper questionnaires survey.

The results of basic information, respondents were mostly women, age distribution between 65-69 years old, they live in urban areas the most, most married, spouse alive, almost illiterate, educated in high school the most, mostly in retirement status. Their favorite activities at home, there are usually at home cooking up a week 5-6 week, you can prepare your own meals independently

This study using factor analysis (chi-square test correlation is 2294.71, the significance level of $p = .00$; sampling suitability to KMO (Kaiser-Meyer-Olkin measure of sampling adequacy criterion value of 0.8, Luo Wenkun, 1986), Extraction elderly user lifestyle includes live and work, health and enjoyment, practical and authority, traditional and conservative, brand-oriented.

Select "live and work" and "health and enjoyment" as the representative of in-depth interviews, because this group has a healthy, positive, helpful, and pay attention to the characteristics of home life, and these are related to independence and enjoy life

From the "live and work" and "health and enjoyment" selected population scores higher, and the need is much higher than the overall average score of 384 for the elderly user that as the representative of focus (Table 4)

The first stage of the process enjoyable experience for meal preparation part, using in-depth interviews (in-depth interview) in the focus group interviews, the use of unstructured interviews (Wulz, 1990), the interview lasted two hours and a half, a break once divided for two echelon proceed. The results showed that:

1. Respondents cook one meal a day on average that mostly for dinner.
2. The pantry behavior includes washing, cutting, cooking, cleaning utensils
3. The findings pleasure vocabulary has 27 words, unpleasant words a total of 20, and the corresponding kitchen supply such as Table 28, and the findings focus on the most pleasurable feeling is wok

Table 4: Overview of focus group respondents in each grouping average

NO	NAME	live and work	health and enjoyment	practical and authority	traditional and conservative	brand-oriented
S1	Mr Zhang	3.88	2.43	2.60	3.00	0.67
S2	Mr Lin	2.38	3.43	2.40	1.33	1.67
S3	Miss Jane	3.75	1.57	1.60	3.00	0.67
S4	Miss Ye	2.13	3.00	2.60	1.33	2.33
S5	Miss Shi	1.88	2.71	2.20	2.67	2.00
The total average		3.03(234 people)	2.69(89 people)	2.83(15 people)	3.29(15 people)	2.81(7 people)
Total 360 people (Deduction across two or more ethnic groups)						

The second phase of the study user requirements and design features, the use of focus group findings arising from pleasure, to understand the needs of attractive, and be constructed QFD house (QFD) interviews. The results showed that:

1. Kano model Findings
 - (1) The pot body attractive (value> 18), including aperture size, fast heat conduction, easy to clean, basic functions, durable, non-stick pan, suitable size, material, member location, shape, heat, and can not afford to smoke qualities.
 - (2) The handle attractive (value> 18), including insulated 、 lightweight and easy to get, easy to clean, in line with the hand.
2. QFD Findings
 - (1) pick out a user needs more than four points or more important factor (Figure 14)
 - (2) The most important body of the pot to prevent hot, fast heat fast, fast heat dissipation; handle the most important is not slippery, lightweight easy to pick up, in line with the hand.

According wok set QFD findings from a new type to prevent hot as the main factor, therefore, consider reducing the heat transfer area, increase the cooling area, insulation materials, etc., to design and development of kitchen supply for elderly user.

This research compiled respondents and expert advice, this study is expected to conclude meet the the improved design of the elderly wok focus as follows(Table 5):

1. The wok heat groove design
2. The wor's bottom has thermal design
3. Addition wok pan edge design to facilitate pouring dish
4. Reduce the force of the weight of the wok support design

5. The wok's bottom has thermal display

Table 4 : The design style of wok

Type 1		Type 2		Type 3	
					

5. CONCLUSION

1. wok heat trench both beautiful and attainable cooling effect, it is recommended that the cooling rate of the related experiments
2. Testing the bottom pan angle and vertical position of the point to get the best position and angle to reduce the force is increased by granting the safety wrist
3. Recommended wok beak designed to operate that understanding the most suitable size diameter
4. Increase in the bottom of the wok thermal design (such as concave, bumps and vertical angle) that need for the size of the experimental gas stove.

Development new types kitch supply for elderly user was limited by the lack of knowledge and processing technology, and resulting in the concept of output is difficult, so still need help in different areas of professional technicians. In addition, the combination of different materials (e.g., wood and iron), with perhaps another possible starting material for the new design style.

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REFERENCES

- Atchley, R. C. (1988). Social forces and aging: An introduction to social gerontology. California: Wadsworth.
- Brandmeyer, D. D. (1987). Higher education activity and life satisfaction in the older adult. Unpublished doctoral dissertation, The University of Georgia.
- Chen, M. Y. (1999). The effectiveness of health promotion counseling to family caregivers. Public Health Nursing. 16(2), 125-32.
- Engel, F. J., Blackwell, R. D. & Miniard, P. W. (2001) Consumer Behavior, 9th Ed.
- Guo zheng-De (2005). Seniors participating in recreational sports, lifestyle factors and research hinder: freshwater areas in Taipei County as an example. Knowledge of the truth movement Journal,2,79-94.

- Gau di-Li (1993). Cultural and recreational leisure activities elderly. *Community Development Quarterly*, 64, 85-86.
- Heli Fang (1992). Taipei Elderly leisure activities and life satisfaction. Unpublished master's theory. Taipei: Soochow University Institute of Social Work.
- Harris, D. M., & Guten, S. (1980). Health protective behavior: an exploratory study. *Journal of Health and Social Behavior*, 20(1), 17-29.
- Kalish, R. A(1985), 老人心理學(Psychology of Human Behavior)(張隆順譯)。台北：桂冠圖書。(原作 1970 年出版)
- Levin, J. S. & Chatters, L. M. (1998). Religion, health, and psychological well-being in older adults-findings from three national surveys. *Journal of aging and health*, 10(4), 504-531.
- Li Xinyi., Gao Chi Chung. (2011). To investigate the relationship between quality of life and lifestyle of the elderly community. Unpublished master's thesis. Chiayi City, I-Shou University Master of Health Care Administration.
- Lin Lihui (2001). Research on learning activities and life satisfaction of elderly people to participate in the relationship. Unpublished doctoral dissertation. Chiayi County: Adult and Continuing Education Institute of National Chung Cheng University.
- Liu yan Ying, Wang Hui xuan (2005). The age of the metropolitan area by continuity of care retirement community attitudes research: Taipei City as an example. Unpublished master's thesis, Chang Gung University, Institute of Management.
- New York: The Dryden Press.
- Parker, S. (1982). Retirement as leisure? In Allen, G. (ed). *Work and Retirement*. London: LTD, 138-149.
- Reynolds, F. D., & Darden, W. R. (1974). *Construing Life Styles and Psychographics*. Life Styles and Psychographics, Chicago: American Marketing.
- Shi Qing Fa (2000). Elderly leisure participation and leisure experience in the sense of freedom the relationship between boredom and leisure needs. Institute of Medicine, Kaohsiung behavioral science master's thesis.
- Talento, B. N. (1984). The impact of lifelong learning on the life satisfaction of the older adult. Unpublished doctoral dissertation, Claremont Graduate School.
- Taiwan's Ministry of the Interior, Accounting and Statistics (1994). The investigation report elderly in Taiwan.
- Taiwan's Ministry of the Interior, Accounting and Statistics (2000). The investigation report elderly in Taiwan.
- Walker, S. N., Sechrist, K. R., & Pender, N. J. (1995). The form of permission to use Health-Promoting Lifestyle Profile II. University of Nebraska Medical Center.
- Walker, S. N., Volkan, K., & Pender, N. J. (1987). The health promoting lifestyle profile: Development and psychometric characteristics. *Nursing Research*, 36(2), 77-81.
- Withnall, A. & Percy, K. (1994). *Good practice in the education and training of older adult*. England: Ashgate Publishing Limited.
- Wang Pei-Yu., Su Ja-Cho. (2006). Mature age of media use and research life style: the 2004 World disseminate new database as an example. Unpublished master's thesis, Taipei: Institute of Communications Management, Shih Hsin University.
- Xuli Zhong (1989). *Old problems and countermeasures*. Taipei: Laureate Book.
- Yao Kai-Ping (2002). Taiwan version of World Health Organization Quality of Life Questionnaire development and application of. *Taiwan Medicine*, 6 (3), 193-200.
- Yao Kai-Ping (2002). Introduction to the concept of health-related quality of life measurement principle of. *Taiwan Medical Association*, 6 (2), 183-189 92.
- Zhang L, Chen Guang-hua (2006). Taiwan's elderly care market buying behavior research: a C Medical Center as an example. Unpublished master's thesis, National Chiao Tung University Management Program Executives Institute.

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