

Vertical Space Management for Cultural-Based Kitchen Furniture

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ABSTRACT

Thai food is broadly known for the use of many complicated ingredients and cooking processes such as chopping meat and vegetables and pounding spices. This complexity is also recognized in Thai kitchens. Traditionally, people set all their cooking equipment a reachable distance because most of them sit on the floor when doing these activities. Nowadays, due to urban living environment that people tend to avoid many cooking processes, kitchen equipment is made of modern materials such as MDF and PB which are not suitable for traditional Thai cooking processes. However, there are still traditional cultural practices observed in Thai kitchens, especially by elders.

This research addresses the issues involved in kitchen design for elderly in Thailand and some other Southeast Asian countries. By targeting Thai elders cooking for their families twice a day, the typical kitchen design influenced by western standards are unsuited to Thai cooking processes. Data for the case study were gathered from seven in-depth interviews and from observations of cooking processes from a major premium-quality concrete kitchen company in Thailand. Data were analyzed by patterning user behavior considering two major issues: cooking culture and task-based concept. A full-scale mock-up kitchen was developed to be used by six elders for behavioral testing. This study found that 1) vertical space management for cultural cooking tools needs more vertical space above the cooking area and 2) cultural-based working surface design needs more robust working surfaces than in modern, western style kitchens.

Whilst design and furnishing were not the main focus of this study, the data showed that modern design and furnishing can be improved for elderly people wishing to prepare food in traditional ways in today's environment of aging society.

KEYWORDS: Cooking culture, Task-based storage, Performance-based posture

1. INTRODUCTION

In the next 10 years, Thailand will completely be an aging society as the number of elderly tends to continuously increase from 13.2% in 2010 to 32.1% in 2040. The proportion of the elderly population, aged 80 and over, is likely to increase significantly by the

number shown at 12.7% in 2010 and is expected to increase to 19.1% in 2040 or approximately 1/5 of the whole elderly population in Thailand (Foundation for Older Persons' Development, 2015). This means that the elderly in the future tend to be healthier than in the present; thus, the quality of life for the elderly will be more considered and important in the future.

For this reason, we start to see a significant development in terms of equipment, products, working place, and living space for aging people more than ever. There is an estimation that more than 99% of older people over 65 have expressed the desire to spend most of their time at home. The issue of caring for these elders to keep them happy at home is likely taking into account more than usual. Mostly, the content is about the prevention of dangerous accidents in the home or living space (Silpasuwan, 2015). Therefore, living space in residential areas should be adapted or improved to lift up the quality of life for aging people especially the kitchen which ranks second, after bathroom, as the most common places where older people fall (Carter, Campbell, Sanson-Fisher, Redman, & Gillespie, 1997). At present, the kitchen design of the elderly is implemented in many ways and ideas such as movable kitchen table for the elderly. Also, design concepts are mostly related with safety considerations as follows: counter height should be 80 cm. from the floor level: an area underneath the sink should be empty for wheelchair usage; hob, refrigerator, and drawers should not be located in the corner; hanging cabinets and shelves should have height from the ground level around 150-168 cm.; good ventilation system is needed; natural and artificial light are required, and electrical outlet position should be 90 cm. height from floor (SCG Experience, 2017).

However, from the observation, there are many Thai elderlies who still have the duty to cook and prepare meals for their family as a daily routine. Many of them are familiar with traditional cooking which does not only pertain to the cooking process but also the use of cooking equipment.

In the culinary culture of Thailand since ancient times, every activity happens on the floor when cooking is done. Whether it is pounding chili paste, chopping meat or vegetables, most of the food ingredients and equipment are in the reachable distance (Pimwern, & Phetsuriya, 2014). Moreover, Thai cooking methods are obviously complex and have many components, so it usually takes a long time to prepare and cook. Thus, cooking with comfort should be more contemplated when the elderly has cooking activities in their kitchen.

This research focuses on space management such as kitchen counter area and inside hanging cabinet to be easily used and suitable for Thai cooking culture.

This research method is divided into four phases as follows:

1. "Persona study" was the first phase used for collecting information through in-depth interviews and observation with the elderly who are 60 years old and up. They normally cook as part of their daily routine or are responsible to cook for their family at least twice a day.
2. Making a "solution development" by gathering all information from persona study phase then selecting some important issues to conclude as keywords
3. "Initial idea and mock-up test" from keywords that led to three times of testing and the result was used for improving and confirming the final initial ideas
4. Mock-up test conclusion.



Fig 1 Examples of posture to reach equipment and ingredients by the subjects

2. RESEARCH METHOD

2.1 Persona study

The criteria for subject selection included the elderly who are 60-year-old or over, normally cooking by themselves or having cooking activities as their daily routine at least two meals per day, and who should have some problems that occur in their kitchen. The subjects should have their own solution to those problems. Persona study was categorized into two processes as follows.

The first process was an in-depth interview with seven subjects. The main ideas of the interview were the following:

- Likes and dislikes about their existing kitchen
- Problems that mostly occur or concerning issues in their kitchen
- Attitudes towards ideal kitchen for the elderly

The second process was an observation of subjects cooking their own food for their family while the observer had the permission to record the whole cooking process.

Patterning the problem

- 1) From the in-depth interview and observation, many similar answers made by the subjects and specific issues which obviously occurred during the interview were categorized. For example, a reachable distance of storage and equipment shelf should be in appropriate position as they are used every day. (See figure 1)

- 2) Cleaning is one of the crucial issues for cooking because there are a lot of equipment and cooking areas to clean after cooking but some even clean in the middle of cooking, so convenience of sink position is required (See figure 2).



Fig 2 Cleaning after and in between cooking process

- 3) The consideration for adequate storage is very common in Thai kitchen because there are equipment as well as food ingredients. Also there are plenty of equipment such as the traditional wok, scoop, mortar, and others that are not suitable to be kept in normal storage due to their extraordinary size. Consequently, some additional hanging shelves and rails are typically added in wherever empty areas;

however, this does not mostly consider about human ergonomic. (See figure 3) Moreover, the suitability of finishing material is another point of concern as this usually causes problem in cleaning and performance in some cooking activities, for example, using mortar to pound ingredients on countertop.



Fig 3 Additional hanging shelves and rails for specific purposes

More special comment and advice come from kitchen design company which specializes in built-in kitchen particularly with concrete structure. Then the whole information from an in-depth interview, observation, and special advice is categorized into groups of issues and finally concluded to be some interesting keywords for the next process.

2.2. Solution development

Keywords are delivered from information that is separated into 2 main groups which are the “must be concerning issues” and “should be concerning issues”. These keywords are storing all visual observations, reaching postures, cleaning postures, linear movements, new perceptions, safety, new experiences, cooking styles, and cooking culture. (See figure 4)

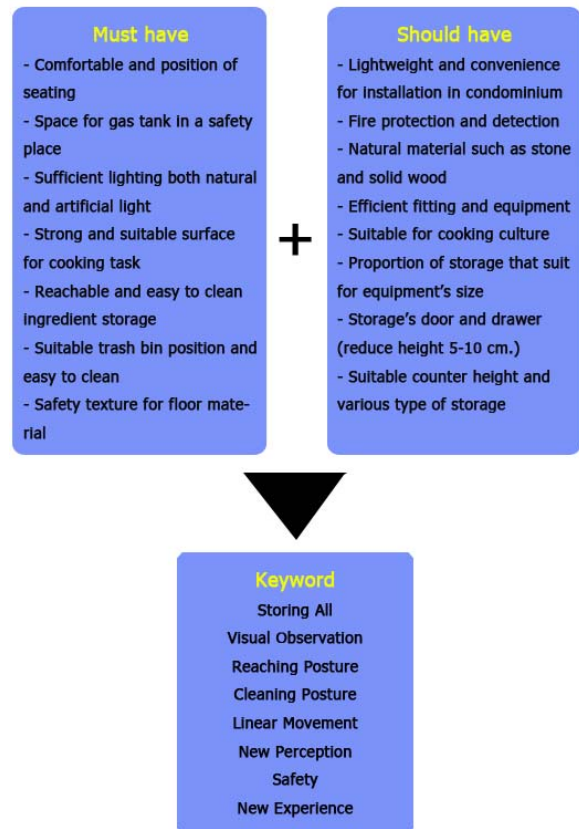


Figure 4 Conclusion of keywords from main issues from in-depth interview and observation

2.3. Initial idea and Mock-up test

In this process, some of the keywords were selected as the point of interest in order to use them in kitchen mock-up testing. The three solutions which were derived from the analysis of keywords are cultural-based solution, task-based solution, and performance-based solution.

1) Cultural-based solution: Thai food has numerous complicated recipes and ingredients as well as processes resulting to time consuming cooking activities. Some old people may have health problems such as osteoarthritis in the knee, so providing a seating space for cooking is required. In addition, grinding and pounding ingredients by using a mortar are ordinary and typical ways of food preparation which is a part of Thai cooking culture. There is a need of suitable seating platform to make the cooking process more comfortable. (See figure 5)

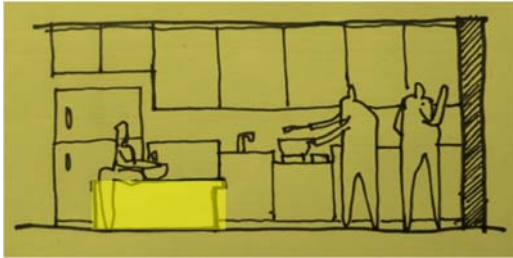


Figure 5 Seating platform for doing cooking activities

2) Task-based solution: It was found that the height of the kitchen counter was related to each activity involving the cooking process. Based on the interview and observation, one level of height of the kitchen counter nowadays may not be suitable for actual cooking activities. For example, the postures in washing, cutting and cooking vegetables are totally different. The cooks' ways of lifting their shoulders, using their hands and reaching out the ingredients are different too. Therefore, determining the height of the task area of a kitchen counter to be appropriate for cooking activities should help older people to cook more conveniently.

Thus, emphasizing vertical space management of various heights between kitchen counter and hanging cabinet allows the design solution to occur. (See figure 6)

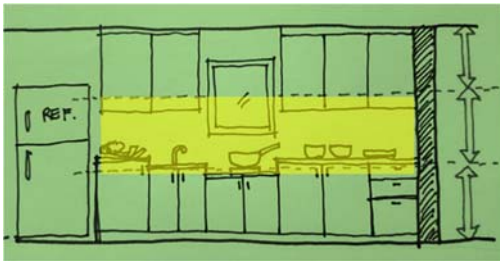


Figure 6 Vertical space between counter top and hanging cabinet

3) Performance-based solution: The flow of cooking process for elderly is taken into consideration. This is because there is a very similar answer from 7 subjects, and in conjunction with the experience from a professional kitchen designer, the straight line kitchen counter or I-shape is the most preferred and comfortable. Hence, it allows the cook/user to have a higher performance in comparison with the U-shape, L-shape, and parallel shape of counters. I-shape cooking counter allows the user to clearly see ingredients in the front and the whole equipment on the counter. (See figure 7)



Figure 7 I-shape counter and cooking process

The next process deals with usability test of the kitchen counter made of a paper mock-up model scale 1:1 as a tool while the kitchen mock-up is combined with seating, sink, preparation, hob and hanging cabinet units. (See figure 8)

The main strategy involves testing the subject performing different cooking tasks such as washing, pounding, and chopping ingredients as well as cooking food and washing kitchen equipment. These entire tasks will allow the observer to see the relationship between the culinary process and the aptitude of the user. The first kitchen mock-up is designed in different heights of the counter unit. (See figure 9)

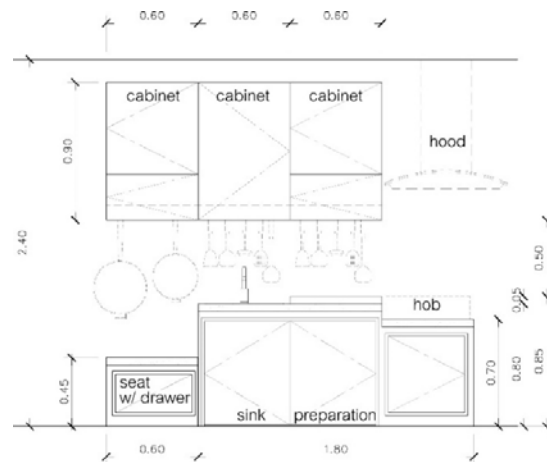


Figure 8 Drawing of the combination of kitchen mock-up test unit



Figure 9 The first kitchen mock-up test scale 1:1

2.4. Mock-up test conclusion

The conclusion of the first kitchen mock up test

1. Seating height was suitable at 45 cm. because the subject preferred sitting and pounding food ingredients by mortar instead of standing. However, the position and depth were not adequate while the suggestion was to use movable seats that would be kept under the counter for convenient use.

Solution: Design seating unit separated into two pieces; one is used as a seat and the other is used as a low table for pounding and keeping the seat.

2. Sink unit was too low at 80 cm. as the subjects bent their back while washing kitchen equipment.

Solution: Increase the sink unit at 85 cm. height but keep various sink depths.

3. There was enough height for preparation unit at 85cm. There was a more comfortable option in having a movable solid cooking platform as it would help the users to adjust the countertop height by themselves. Also, the height was suitable for chopping meat and vegetables.

Solution: Expand the unit length from 1 unit to 2 units.

4. Hob unit had no appropriate height at 70 cm. so it should be elevated at 75 cm. or 80 cm.

Solution: Provide two options of unit height at 75cm. and 80cm.

5. It was appropriate to have equipment hanging rail to be useful for extraordinary size of equipment typically used in Thai kitchen, such as traditional wok and scoop. On the other hand, an improvement should include repositioning of the rail that makes picking up and hanging equipment more convenient.

Solution: Provide an adjustable hanging rail for testing of the height specifically.

6. Hanging cabinet was hard to reach and open because it was too low, and its doors were swinging.

Solution: Adjust it to be higher and change the door into sliding door.

Therefore, the results from the first mock-up test influenced the following mock-up test. It required changing the counter height and repositioning both seating unit and hanging rail. (See figure 10)

The second test also followed the main strategy as mentioned previously. (See figure 11)

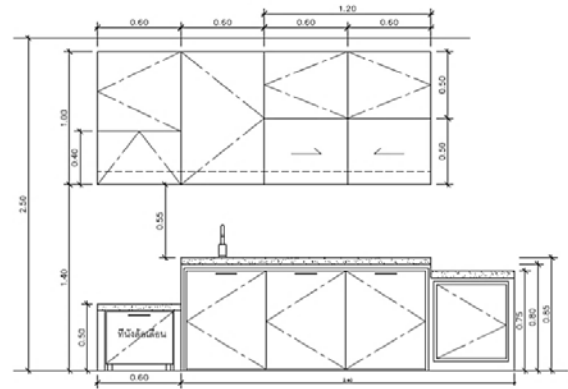


Figure 10 Second drawing of mock-up kitchen counter for the second test

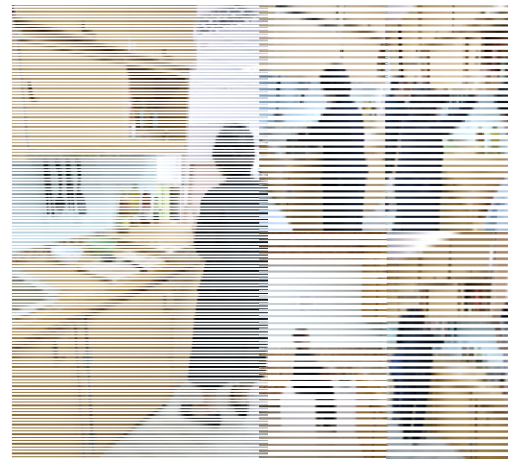


Figure 11 The second kitchen mock-up test scale 1:1

The conclusion of the second kitchen mock-up test

1. Seating unit was more convenient to use but the subjects still struggled with their sitting posture as it is too shallow to position their legs.
2. The height of sink unit was suitable at 85cm. The height didn't require the subjects to bend their back down when using it.
3. Subjects were more comfortable in using this preparation unit because its length could be increased more than the first test.
4. There was a good response due to convenient use of hob unit at 75 cm.
5. Reaching the equipment hanging rail at 55cm above from kitchen countertop was appropriate and more convenient.

Sliding door was more convenient to use than swing door.

4. DISCUSSION

Cooks' behaviors reflect cultural origin, and the way of living is totally different from western culture. Even though, many elderly can adapt themselves to western kitchen style but this may not be suitable for their way of cooking and cooking equipment. In relation to Thai cooking style, the whole process of the research has an intention to find the most convenient way of cooking specifically for Thai elders.

In general, the whole research process can be concluded into two main ideas affecting the consideration of kitchen design for Thai elders. The first idea pertains to the vertical space management for traditional cooking tools to provide users comfort and convenience when using their cooking tools. Obviously, the reachable distance of cooking equipment and the way of cooking are related to each other as indicated by the appropriate posture of the cook.

The second main idea is about cultural-based working surface design that should be more robust and convenient than the modern western kitchen. The result based on observation shows that most of the subjects from the persona study and mock-up test demonstrate the same ways of preparing ingredients, such as pounding, chopping, and cutting in traditional ways of cooking and equipment. Finally, Thai cooking culture still has a very strong influence of Thai kitchen cook especially for elderly who are still familiar with traditional ways of cooking.

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