

## THE STUDY OF DIFFERENT USER GROUPS USAGE NEEDS IN LIVING SPACE

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### ABSTRACT

The trends toward more elderly and fewer children did change the family structure in Taiwan. There was more and more three-generation family. The elderly spent more time in living space, also needed to take some household duties. However, the living space interior design often neglected the elderly needs. According to the reference, the research found that elderly accommodated themselves to other family members easily and hard to be aware of the living problems by themselves. These showed the lower awareness and needs of the elderly and the different requirements between them and regular people. The research aimed to two different user groups' usage problems and needs in living space, hoping to find out a better living environment that suitable for different group users.

First, the research sorted usage behaviors into six classifications according to the literature review results, then, designed a "user questionnaire" for the experiment of user groups' problems and expectations in living space. Analysis aimed to compare the different results of problems, needs, and expectations between two group users in living space. We hoped to set up design guidelines for new built or rebuilt living space and provided a better living space for different group users lived together.

**Keywords:** *living space, usage behavior, user group*

## 1. INSTRUCTION

Social trends change gradually in Taiwan. Extended family evolving into nuclear family not only makes in-home elderly care hard, also causes the problems with grandparenting. According to the survey of social development, there were more and more three-generation family and it showed the increasing rate of children living with their parents and grandparents [1]. It showed the wider age range of users in family and more shared-living situations.

A family included family members and real living space. Real living space was fixed; it should satisfy users' physical and mental needs. There were user groups in the living space such as children, male, female, elderly and other people. No matter how they lived, they all had different problems. The effects on time line and different variables of users would influence their physical functions and abilities; and further, force users to change their regular habits. The lack of changeable equipments and products would be users' daily problems. Unconscious users would often ignore the living problems and inconveniences; even accommodate themselves to other sharing users. And above all were common issues in recent families.

The research classified living usage behaviors into movement, bathing and excretion, sleeping and rest, housework, eating and leisure time 6 parts [2][3]. From the perspective of users, the research aimed to the different needs of users and how to improve the shared-living situations. Then, concluding every user group's usage behaviors and problems, hoping to propose proper living space design guidelines.

## 2. REFERENCE AND REVIEW

### 2.1. Recent living space

The relations in living space included "environment-product-user." In this open space, contained different issues such as safety, room, scale and appearance, how to ensure and protect users through proper house performances was very important. House performances included lighting, sound insulation and ventilation. Living with good house performances would maintain excellent living qualities in living spaces [4].

According to housing statistics, till the end of year 2007, the average of living area was 43 square meter per person [5]. In year 2008, the house area average of buying was 122.6 square meter. The needs of over 165.3 square meter big house were decreased quickly. The major considering points of buying a house were its units and community environment; price was not the most important issue [6]. For the people who wanted to buy a house for next 3 years, they would hope to buy a 164.2 square meter house with 5.46 rooms and each person own 37.7 square meter [7].

There were residence and residential-commercial mixture 2 housing types in Taiwan. Residence type included town house and apartment; residential-commercial mixture type included business-store house and business-office house. There was no significant difference in usage behaviors between each housing types. But it would be totally different from

physical needs, family cycle, occupation, business item, religious belief, family structure, culture, interaction and other factors [8].

## **2.2. The usage behaviors in living space**

Following were the 6 parts usage behaviors' problems.

### **Movement**

The height of doorsill and ground would influence the way to open a door and the behavior of in and out. Narrow and long corridor not only made walking inconvenient, also caused pressure easily. Corridor with a lot of stuffs and repeatedly movements also would influence the moving behaviors and increase the body load.

### **Bathing and excretion**

In Taiwan, most bathing and excretion both were in one space. People usually combined shower and bathtub for saving space, but the movement of entering the bathtub would increase the loads of foot and body. A mother-to-be interviewer changed bathing way in the end of pregnancy; she sat on the toilet taking a shower. But it would make the floor wet and increase the rate of falling. Immovable shower nozzle would increase different height users' body loads. Most elderly had problems about squatting and getting up. The position of tissue paper would influence the excretion behavior.

### **Sleeping and rest**

The average sleeping time (including nap) per person was 8'40" in Taiwan [9]. Bedroom was the major space for sleeping and rest, also played an important role in personal private and self-confident. In terms of house performances, space size, lighting, sound and other conditions were the key points of maintaining qualities.

The bed size, hardness of mattress, height of bedstead and other conditions would influence the sleeping qualities. Husband and wife sleeping in one bed often had the problem about interrupting while sleeping by the other turning the body over, getting out of bed or other acts. A mother-to-be might not sleep well because of her fetus and influence the husband.

### **Housework**

Housework included a lot. The major works were cooking, washing, cleaning and storing. Many works needed large amount of time and energy. The major problem was the lack of space, others were too much stuffs, hard to clean, hot and windless. No matter traditional or modern kitchens both had above-mentioned problems. In the processes of cooking, the moving line from refrigerator, sink and stove, 3 positions decided the usage behaviors. Working space limited the number of people in kitchen. The cleaning up works after meal often were families doing together. If the height of working table and sink were not suitable for users, it was easily caused body over load situation.

The major washing works were washing clothes, sun-dried clothes and folding clothes up. Female would often be in charge. The number of using washing machine was according to the quantity of families' dirty clothing and other articles. The processes of hand washing were

soaking, rubbing, washing, screwing and other acts. Storing or using related tools such as washbowl, washing powder, washboard and other materials all needed proper space. Immovable clothes pole was not suitable for different height users, the actions such as raising arms high or bending down would make them felt tired when working a long time.

#### Eating

There were long-term and temporary eating spaces. Regular dining together was long-term, had fixed time and space. Temporary types were afternoon tea, late night snack and other foodstuffs with no space limit. A suitable chair and table for sitting, proper distance from user to furniture and easily setting the table all would make eating more smooth and comfortable.

#### Leisure time

Leisure time activities in family included group and person. The major activities were talking, watching TV/movies, doing interests and other ways. Families often communicated with each others in living room, lounge and other spaces. In other side, families did individual activities in their bedroom, workroom and other spaces. Not only needed a proper space for communication, also needed good quality, it would comfort every family member and improve the atmosphere. A good communicating environment could change and influence family unobtrusively and imperceptibly.

### **3. METHOD**

The research used closed questionnaires doing living usage behaviors consciousness experiment, tried to understand different age, sex and ability users' physical and mental problems in living space [10][11]. Using judgment sampling sent questionnaires by face to face, post, e-mail and other ways. There were youth (23~45 years old), prime (46~64 years old) and elderly (over 65 years old) 3 user groups. Let subjects fill the questionnaire up basing on their living habits and experiences. The questionnaire included basic data, problems of usage behavior, problems of communication, change and decision and future expectation 5 parts.

### **4. RESULTS AND DISCUSSIONS**

#### **4.1. Basic data**

There were total 243 valid questionnaires (male 99, female 144) and the table 1 showed the details of subjects.

According to the height range results, 161~170cm height people were the most (male 161~170cm, female 151~160cm). In term of chronic ill, major symptoms were vision, shoulder and waist problems. Only female (12 persons) had housewives' hand eczema. The majority thought they were health.

**Table 1:** Basic data of questionnaire

Subjects	Numbers	Sex	Numbers
Youth	164	Male	75
		Female	89
Prime	48	Male	11
		Female	37
Elderly	31	Male	13
		Female	18

#### 4.2. Questionnaire analysis results

The questionnaire analysis results were sorted into 4 parts which were “problems of usage behavior, problems of communication, change and decision and future expectation.” Using correlation coefficient tested the relevancy from different user groups, sex, problems and needs.

##### 1. Problems of usage behavior

The analysis results were sorted into 6 parts, living behavior, electrical appliance, bathing behavior, cooking and eating, household jobs and sleeping and rest.

##### Living behaviors

The major problem was “blocking from objects on floor or furniture.” There were no differences between sex and age; all user groups had this type of problems. The lack of storing stuffs was an important reason that influenced the regular behaviors. Elderly felt trouble with “hard and slippery floor, sliding cushion or carpet” and it showed the weakness of facing the accident. The material of floor should prevent falling situation and reduce the chances of using sliding cushion or carpet.

- Electrical appliance

The prime and elder felt trouble with unclear electrical appliance label and it showed aged people not only read and understood instructions hard, also feared to use latest type electrical appliance, that would increased their body load. People had to use every kind of electrical appliance in recent year, if them not used them correctly, it might cause electrical dangers.

- Bathing behavior

The lack of independent dressing space and temperature regulator in Taiwanese bathroom let the bathroom accident rate was the highest. Adding emergency equipment could earn more helps when accident happened. The analysis results showed that elderly cared accident rate much more than youth and female also more than male. It could be noticed that female’s attitude of dealing accident was more positive than male.

- Cooking and eating

Every user group thought the height of sink was not proper and easily caused the over load situation. It showed that the design of working table and sink should consider more about ergonomics. Youth and prime female had more problems of ergonomics than male. It could be noticed that the kitchen design not aimed to the target user group.

- Household job

The lack of storage and sun-dried large-sized clothing space and hardly cleaned the corner were the common problems, the female's housework problem rate was more than male. 93.3% prime female felt exhausted doing housework. Prime not only faced the retirement life, also influenced by sons and daughters getting married and starting a career. In this case, they would stay at home more and need to do more housework. Moreover, their body degenerated gradually and easier felt tired about heavy housework.

- Sleeping and rest

The major problems of sleeping and rest were noise, sleeping in one bed with others and the lack of bedside cupboard. It showed the private degree of bedroom. If the sound insulation in bedroom was not well, not only influenced by exterior noise, also could not keep secrets and let sleeping quality down. Everyone used to keep different kind of personal things by their side. If there were no place for bedside furniture, it would increase the searching time and influence the movements of getting up the bed.

The husband and wife of prime spent over 10 years together. They had more problems of sleeping in one bed together than other user groups, and 94.7% of them were females. It showed that female's sleeping quality would easier be influenced by others. The thought little of sleeping in one bed together would effect the decision of choosing and buying different types of mattresses. 20.0% prime and 35.9% elderly had no problems of sleeping and rest, it might because they use to sleep this way and that make them to ignore the inconveniences. Among them, 17.9% elderly had problems about the short of night and natural lighting. It could notice that enough lighting in living space was a very important thing for vision degenerating users.

#### Problems of communication

The major communicating activities of family were "talking and watching TV/movies," among them, elderly liked to join the religion activities, 40% youth and prime liked to have meal with families on a regular time schedule. Comparing with the analysis results between female and male, we could find that 33.3% male chose "doing housework together, having meal with families on a regular time schedule" and 45.5% female chose "doing interests together."

Over 90% subjects thought communicating spaces were living room, dining room and kitchen. Among them, 28.0% prime male chose "master bedroom" and it showed husband and wife in this ages had more time being with each other. It might because most of their sons and daughters got married and started a career. They did not have to worry too much. The analysis results of elderly were "living room (93.8%), dining room (43.8%) and lounge (15.6%)," no "kitchen." They might not need to do heavy housework because of their age,

ability and other reasons. And their communicating activities with families were regular talking, watching TV and other activities.

46.5% subjects satisfied with their communicating qualities, among them, over 50% female, youth and elderly also felt satisfied. It showed these users identified communication and space qualities with their families. Especially, over 58.0% prime satisfied with their communicating qualities. It might be because they had more time for themselves after retirement from career and no need raising son and daughter.

#### Change and decision

40% families decided important decision by whole family members, 30% by parents and 15% by mothers. "Mother" played a deciding role more than "father." It could be noticed that different sex and age would influence the holding power person and viewpoint. Old timer people thought father and elder member of a family would always present the whole family. But follow the trends, there were more and more people lived in the sexual equality and double salary family. That made female having more power in family and pointing out their responsibility for the family, also increased their pressure.

#### Future expectation

All user groups wanted living room to be bigger most, followed by washroom, storage and leisure time space except elderly. Prime hoped to change the living space to fit their needs. Elderly used to accommodate themselves to other family members and had fewer expectations about shared-living situation. They cared about storage, convenient washing and sun-dried clothing space and bedroom more for their basic living needs.

On the whole, subjects would like to have "AV equipment, temperature regulator and Jacuzzi" at home in the future. It could be noticed that regular family owned enough living equipments and their future wishes were about increasing living qualities and enjoyments. In other side, subjects all had conscious of temperature differences while take a shower or excretion, paid much attention to the needs of temperature regulator. According to the analysis results, prime would like to give consideration to enjoyments and needs, 25.0% of them hoped to have karaoke equipment and 22.9% hoped to have emergent equipment. It showed that prime subjects thought highly of their own safety in the future. Only 18.5% elderly hoped to have more equipment, the rate was much lower than other user groups. And most elderly subjects' hoped to have functional equipment such as dish washer, clothes pole and other equipment. It could be noticed that elders' body might not afford to do heavy housework such as washing up and sun-dried clothing. They hoped to improve these parts in the future and have emergent equipment, too.

### **4.3. Discussion**

#### 1. Body function and problem

According to the analysis results of chi-square test and correlation coefficient, users' bodies would change by timeline, also influence from uncertain accidents. The influences of degeneration, chronic ill and accident on movement would cause biggest inconveniences and problems in daily life.

The physical, responsibility for housework and role differences between male and female would influence their body conditions. Most Taiwanese female played an important role in housework and easier had housewives' hand eczema. And male often had the problems of waist and back.

## 2. Problem of living space

The abilities of receiving news and adapting new products would be worse when users getting older. Moreover, their body degenerated and could not quickly react to suddenly accident. For example, the invisible danger of falling by doorsill would easily cause problems to the elderly. Living in the same living space, real living space and fixed furniture were hard to change. After long time uses, users would easily be used to their home. According to the analysis results, it showed that elder accommodated themselves to others more than younger.

Female had more problems in real living space, it could be noticed that the lack of ergonomic considerations would cause this situation. Female could not afford heavy housework such as carrying heavy stuffs, storing stuffs in too high or low place and other acts because of the physical differences between male and female. And daily life included the satisfactions of mental needs. All users cared about living qualities, among them, male paid much attention to cold handrail and female took notice of slippery/cold ground material. As above-maintained, users in living space included male and female, no matter space, equipment or product, all needed to consider the physical and mental differences between them.

## 3. Communication

According the analysis results, younger had more communications with families, but elder not. It might because elder leave job and depart from social networking longer than younger; their abilities of receiving news and bodies were different than before. Further, it influenced the communications with families, also made the focal points of helpless position of the elderly in family. Only if families tried to change attitudes and improve the living space's degree of friendly were increasing the confidence of elderly. Female paid much more attention to communications than male and expression ways were plenty. It showed the differences in emotional expression between male and female.

## 4. Future expectation

In term of future expectation of equipment, younger wanted more than elder. Younger showed positive attitude of improvement and elder was opposite. The afraid and hard adapting attitude showed that elder needed family helps more to find out and improve the living inconveniences and problems.

According to the analysis results, female hoped to improve real needs such as storing, emergency equipment and other equipment in the future. And male hoped to have AV equipment, Jacuzzi and other equipment for enjoying improving the living qualities. It might cause by the responsible differences between male and female.



## 5. CONCLUSIONS

The division of housework would be different from housing type, space division, family members and other situations. Frequently usage behaviors would become the usage behavior mode of a family. For youth users, it would not be a big problem, but when users got older and body changes, they would find different problems in daily life. From education stage (teenager) to work (youth), retirement (prime) and aged care (elderly), different ages had their own responsibilities and it would influence their role in family.

The degeneration of the elderly would influence their usage behaviors, especially "movement," but they often ignore this kind of problems. If the design in the living space avoided the different height/slippery ground, adding handrail/night lamp, using dry-wet separation bathroom, preparing more space for bedroom corridor, choosing electrical appliances with bigger monitor and other improving methods, all above could reduce elder's problems. The short-term changes such as accident, pregnancy and other situations would cause different effects. Few families would positive improve their living space for short-term changes, users not only had to accept body differences, also needed adopting the same living space again. As above-maintained, these all showed that the lack of considerations of different users in Taiwanese living space. In terms of long-term and short-term changes of families, all would influence the regular pattern. How to let living space have changeable ability was the first step to satisfy every kind of users.

According to the analysis results, elderly was the helpless users in family. There were many researches presented that once elderly had regular leisure time activities, not only increased their confidence and released the mental pressure, also strengthened their body, slow down the body degeneration and improved the living qualities. It could be noticed that family should pay more attention to elders' leisure time activities and interests in the future.

The major user groups in family were youth and prime, 2 user groups' male and female faced different problems. Female played an important role in family, not only in charge of housework, also hold family together in harmony. Because of that, they often had more usage problems or mental overload situations. According to the analysis results, major female had problems of lighting, movement, cooking, housework and other usage behaviors. It might because female easily had degeneration or ill on vision, knees, joints, feet and other body parts. That would cause the exhausted feelings about family responsibility. In term of physical, users could improve the bad environment conditions, equipment, products and other situations. In term of mental, family members should change the thoughts of "husbands shall leave all housework to wives," "husbands works outside, and wives stay at home" and other traditional ideology. Sharing housework and making decision together would reduce the pressure of female. Male also influenced from traditional ideology, they could not express deep feelings or thoughts to families easily. It might reduce their living and communications qualities. If they could release the traditional ideology pressure and express the feelings in proper way, it might freshen up the relationship between families and have nicer living qualities.

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