Shared Kitchen Design for Rental Spaces and Frequent Moving Populations

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Shared Kitchen Design for Rental Spaces and Frequent Moving Populations

by

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A thesis submitted in partial fulfillment of the requirements for the Degree of Master of Fine Arts in Industrial design

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Rochester, NY
April 24\textsuperscript{st}, 2020
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Abstract

With the frequency of population migration and moving increasing across the world, more people are living in shared rental places. It's been reported that 17.2 % of people in China move across cities annually and about 15% of the population moves in the US and Korea annually (UNFPA, Statistics Korea, 2019).

With high residential mobility, connections and social networks are constantly cut off (Wang, 2019). In the long-term, people who move frequently become less committed or tied to their surroundings; they invest less effort on interaction and preservation or their environment behaviors. It has been reported that water and waste pollutions increase with an increasing portion of moving population (Chinese general social study 2013).

The project focus for this thesis is redesigning a kitchen in a shared rental space. As both a functioning and socializing area in a rental, kitchens have a great potential for redesign for roommates. The homogeneity and undifferentiated structure are quite common for most rental kitchens. Such structure often can't accommodate free choice of boundaries, variations, and connections for strangers living together.

The significance of this project is to facilitate positive behaviors and accommodate the behavior changes and tactics. This is in order to improve experience in shared rental, preserve dynamics and sustain the environment in the long run.

The final solution is a system that’s heterogenous, accommodating both boundaries and connections, with some levels of customizability. It’s comprised of color-coded containers for the refrigerator, in addition to portable kitchen stations with removable and customizable surfaces. The individual stations could be either assigned according to different functionality or residents. People could clean and organize differently without disrupting others, and still make food together when they want to.

Keywords

Moving population, shared kitchen, micro kitchen, migratory society, shared economy

Introduction

Problem focus on rental spaces

As both the functioning and socializing area in a rental space, kitchens have the greatest potential for creating new opportunities. As most kitchens in rental spaces resemble kitchens for families, the uniform and conventional structures don’t accommodate free choice of boundaries, variations and connections for strangers living together, which leads to countless small challenges: insufficient space, hygiene concerns, compromises between different habits, etc. These could discourage a feeling of satisfaction.
How might we accommodate heterogeneity and improve the experience and in shared rental kitchens?

**Problem for society**

Currently many major cities are experiencing an increase in frequently moving population. According to many social studies, people who move frequently commit less, preserve less, interact less with their surroundings, and have lowered satisfaction with their surroundings (Chinese general social study 2013, Coulton, 2012). One concern is that cities with more moving population suffer more from waste and water pollutions than other cities (Chinese general social study 2013).

**Research**

1. **User research**
   1.1. **Problem identification**

**Contextual inquiry and user need**

General interviews and questionnaires were conducted to investigate users’ ideal, routines, and experience in the shared rental space, and how they compare permanent housing and temporary housing.

Kitchen interviews were done to understand specific problems around a shared kitchen and what improvements were desirable. Several participants described a lack of counter space for food prep. In some cases, it was because participants had to place appliances on the countertop to keep them plugged in, or keep drying racks next to the sink and condiments next to the stove. They expressed safety concerns for putting things close to the stove. In other cases, it was simply due to the small countertop area. The response of participants was to use additional movable trays for storage and keep appliances out of the way.

Some participants showed strong isolation behaviors and strong tendency to have a minimized ‘kitchen spot’. One participant didn’t cook regularly and has a small instant pot in her own room for making simple food (e.g. instant noodle, soup). The kitchen in her rental was not used and cleaned regularly, she didn’t use the kitchen because the kitchen was a bit crowded and she had hygiene concerns. In contrast, she admitted that she cooked more in her own permanent home. Another participant expressed similar concerns and her response was using a small fridge and some dry food stored in her own room.

Affinity diagram was generated to organize the key points (figure 1) in the form of imperative sentences.
Figure 1

1.2. Data- secondary research

**Questionnaire:**

The questionnaire was released in both the US and China and got 52 responses. Respondents were briefly introduced to the significance and objective of the project and assured that their responses were for research purposes only and would remain confidential. Then they were shown eight multiple choice questions.

Some questions focused on home making behaviors (such as regularly cook, activities in common areas), some focused on degree of isolation or interaction between residents (behaviors such as regular interaction with roommates, negotiation behaviors); some focused on level commitment to surroundings (behaviors such as regularly clean, renovation of space, purchasing furniture).

Most responses were from people who frequently relocated, 60% of them move every year. The data was also cross compared to detect behavior variations under different situations. The responses from people who move at least every year and people who move every two years were compared; responses from people who live in shared rental was compared with those who live alone or in a permanent housing; responses from people who live in shared rental and move at least every year was compared with response from the average moving population.

**Average frequent moving population:**

The major concerns were costs and moving process amongst many other concerns in rental life. The data also suggests that most people found it helpful to have pre-established rules; half of the average population found it necessary to negotiate habits and routines upfront. Seventy-two percent of people think building good relationships...
with roommates would help, however, around 65% of people predominantly or mostly stay in their individual bedrooms, 60% of people spend less than half a day at home and only fifteen percent of people are likely to regularly interact with roommates. Due to the frequent moving, most people utilize the environment but would not commit to the environment much. Around half of people sometimes use the living room; about half people use the kitchen regularly. Only one in ten is likely to rearrange/purchase furniture, a fifth of the people are likely to clean or cook regularly.

*The most frequent moving population (move at least every year):*

Based on the data, this group of people has a similar emphasis on pre-established rules. In comparison with the average group, this group of people show a stronger preference for privacy and isolation. Seventy five percent of people predominantly or mostly stay in their bedroom while they are at home; one in ten people cook regularly. A stronger tendency to utilize the common area and commit less to their surroundings, much less people are likely to regularly interact with roommates, clean regularly, renovate space and purchase furniture when they move in; however, more people claim that they do use the kitchen sometimes but not regularly.

*The not frequent moving population*

Almost half of people in this group live in permanent housing or their own rental space. All of them move more than every two years.

This group of data demonstrates the lifestyle difference between the frequently moving population and the general population who stay longer in one place. The magnitude of these differences is also demonstrated here.

For instance, regarding how to maintain a healthy dynamic and negotiate, all three groups indicated very similar responses. This means that the positive response was more of a shared common sense, it did not necessarily suggest the respondent was living in a healthy dynamic.

In contrast to the previous two groups, a considerably larger percentage of people showed more commitment to surrounding and home making behaviors; a fifth of people are willing to purchase furniture or rearrange space when they move in; a third of people are likely to cook regularly.

In conclusion, with fast paced lifestyle, all groups showed a limited amount of home making behaviors. In particular, the frequent moving population showed fewer homing behaviors than the general population; there were more isolation behaviors and less home making effort and investment to surroundings. Hence, both sharing of space and frequency of moving have influence on such behaviors. This result was in line with results from social studies done by Wang and Coulton (see literature review section), except the influence of moving frequency was not as substantial.
According to some interviews on rental experience, these behaviors significantly weakened homely feelings and fail to fulfill the moving motivation to improve life quality.

2. Literature review - Understanding of shared spaces and residents

There have been many research studies in varied fields (social study, design, architecture) that address the human behaviors, tactics around the topics of home making, alternative lifestyle, and frequently moving population. Some of the findings are valuable for merging interiors with the modern nomads, fast-paced lifestyle.

2.1. Tactics and social studies

Migratory society and behaviors

With the fast life pace and population density in major cities, the frequently moving population has been expanding across the world. Seventeen-point two percent of people in China move across cities annually. Similarly, around 15% of population moves in the US and Korea annually.

With a large number of people moving frequently, society was affected as a whole, migratory societies emerge. Coulton studied residential mobility across the US and agreed that mobility changes community as a whole (Coulton, 2012).

Wang pointed out that in a traditional society with little mobility, people were willing to carefully maintain a good reputation in the community, lasting involvement in surroundings, and always thought about long-term interests. These were both investment efforts and constrains for individuals to lead a good life in the long-term.

With high residential mobility, connections and social networks and associated benefits from previous occupancy were constantly cut off, constraints of the need to maintain a good reputation was weakened. (Wang, 2019).

In the long-term, people became less committed or tied to their surroundings; they invested less effort on interaction and preservation behaviors. Coulton discovered movers in communities showed 10% less neighborhood involvement than stayers (Coulton, 2012). One piece of evidence was that waste pollutions are much higher in regions with higher residential mobility rates in China, due to a lack of preservation behaviors (Chinese general social study 2013).

Alternative Home making

Co-housing: instead of living as conventional households, co-housing is an alternative social structure that brings a sense of community and connections by bonding homeowners who are willing to live in an intentional way. It involves conscious shared experiences and spaces. As described by Jenkins (2017), in Lake Claire cohousing, individual residences were small and the big community common area covered the overflow. Ideally, residents were willing to interact and use resources in turns. According
to Kim (2017), the significance of co-housing is not only to fulfill socializing needs, but also help each other out under emergencies. This is especially important for isolated societies with high lonely death rates. Despite the noble intentions, it was also admitted by residents that co-housing could never be as comfortable as one’s own home due to a few challenges. The shared space was in a delicate position between extension of individual homes and collective home, it was up to residents whether they use public resources in turn (Jenkins, 2017). Some mandatory practices like making decisions and coordinate events together could also be challenging sometimes and led to dissatisfaction and mis-communications. Uniformity of space and behaviors had been reinforced unintentionally, which repressed the human nature of differentiation.

Heterogeneous home
It had been pointed out that uniformed things in homes such as ceiling heights, temperature controls, all-in-one devices brings increased homogeneity. This makes differentiation in different areas across the house difficult, which does not support the differentiating behaviors in space (Peterson et. al, 2010). As opposed to homogeneity or uniformed structures, Peterson et. al called for heterogeneous environments for interior designs, which offers free choice of boundaries, connections and variations at home. These would allow differentiating behaviors and co-existence of different habits in a shared space.

Porous boundary
The notion of a porous boundary is also associated with flexibility in a domestic space. It was described by E. Cheon et al as a division that selectively allow things within a range. Such boundary distinguished things on two sides, and creating separate social worlds, however, it was also flexible as compromises and negotiation could be made. In contrast, blurred boundaries are more flexible and tolerant, things on both sides are indistinguishable (E. Cheon et al. 2018). Such boundaries can be very useful for allowing different behaviors and creating physical and social divisions in shared spaces. For instance, condiments racks could be a blurred boundary, it belonged to someone but could be shared; shoes in front of individual bedroom signified a porous boundary.

Behaviors at home
Peterson et. al studied behaviors of several people living a mobile lifestyle and identified some homing tactics that make their existence physically and psychologically, and Cheon described tactics as ways of using space without necessarily occupying. 

Territorializing was an act of taking in territory by marking traces, participants in the study terrorized their space by playing music in the bedroom, do not disturb signs on the door and putting a pile of clothes in the middle of room. 

Bubbling was the act of excluding outside disturbances. For example, participant in the study bubbled himself by constantly talking on the phone. Bubbling does not necessarily create homely feelings, but made people feel less alienated from surrounding.
Differentiating was applied to distinguish and personalize to separate different spaces. In contrast, doubling provided equal home feelings by duplicating things from home and apply to a different space. For instance, the participants doubled home appliances in their summer house. Rhyming was continuation of routines regardless of mobility.

2.2. Case studies

The Design and Research of the Shared Kitchen System in the Hospital

Xin, Ye et al., came up with a concept of a shared kitchen in hospital. The kitchen in the hospital was used by turn and cleaning up was mandatory. The door would be locked behind users and reopened when they finished cleaning up. It’s beneficial for hygiene issues strong reinforcement of responsible behavior and isolation, prohibit interaction.

Micro kitchen stations

Offers multifunctionality in compact way, however, sometimes the functions are arranged too dense, which could be extremely suitable for one situation and difficult to use for another. Additionally, it could be overwhelming for users when functions are arranged too densely.

3. Summary of objective

Apply some tactics found in the literature review: design elements that create interaction opportunities; allow territorializing and sharing for storage spaces, co-exist of different habits, motivate people to take care of their own spaces, accommodate free choice of boundaries, variations and connections.

4. Kitchen Design guidelines

4.1. Observations based on current designs

Comparison between several standard kitchen layout was conducted and showed that different layouts lead to different user interaction and efficiency (storage space utilization and cooking process). There are some rules followed by most kitchen layouts, which were beneficial as a reference.

The function areas are generally laid out according to the following order: fridge, sink, counterspace, stove. This ensures easy access to food storage, stove and trash during food prep, and a comfortable moving path.

Different layouts and their interaction:

U shape work island (Birchfield, 2008)

A large amount of table surface area but may cause traffic and add extra steps for workflow.
L shaped counterspace along the wall (Birchfield, 2008)

Convenient workflow, save space, create “out of traffic” aisle were prominent features. As stated by Kendon, users standing next to L shaped counterspace could form a side by side formation, z shape formation and a reversed L shaped formation. The first two formations foster conversation and collaboration whereas the revers L shape fosters isolation.

Back to back worktables (Birchfield, 2008)

Efficient, users standing around it could form a transactional or semi-circular position, which could foster shared conversation.

Parallel worktables (Birchfield, 2008)

4.2. Ergonomics and standards

The portable kitchen station would have to be compatible with different kitchen layouts, especially small kitchens. The kitchen station needed to follow standards for kitchen designs but at the same time allow variations for users. Some relation between interaction and layout were useful to come up with an engaging kitchen environment. It has been noted that Standard standing height should be 36-37 inches, operation area width should be at least 60 – 90 cm wide (Zolo, 2018).

5. Iteration

1. A central station with separate counter space around it and standalone stations design (sketch 1)
2. Standalone stations with a kitchen layout (sketch 2)
1. Some organization ideas that allows terrorizing. (sketch 3)
6. User testing and refinements

User testing turned out to be not only useful for discovering shortcomings, but also reinforcing the positive features and identifying benefits from the users’ perspective.

Procedure: I began with the introduction line ‘Hi, this is a shared kitchen design for rental spaces and frequently moving population. Here is a prototype of single workstation for individual dweller. Could you show me your cooking process using this prototype and talk me through while you are doing it?’ Then participants were shown the testing environment, tools and prototype. The procedures were mainly divided in four steps: prep, cooking, eating and cleaning up.

The workflow in the kitchen, cooking habits, storage habits, usability of the station, what the users like and dislike about the prototype, and expectation for an ideal rental kitchen were observed and discussed during the testing and afterwards. Number of steps, cooking path, location of station, and time were also noted down to testify efficiency and usability of the design.

Finally, in tests 3 and 4, users were also shown a small kitchen layout, and asked what they like and dislike, sometimes participants would also point out what they want to be added on the sketch and what’s redundant for them; people in different situations sometimes even gave the opposite opinions.

*Testing 1:* Several cardboard mockups of sink, counter space, utensil props were used for conducting testing in the studio.

Participants were introduced to the design and asked to pretend cooking process with props and explain their thoughts and steps while doing so. The layout was rearranged...
afterwards to probe more thoughts and discover which one is most efficient. Sometimes the participants would ask about the design upfront and explain their habits.

Participants prefer a flat operation surface and need more room around the stove and sink during food prep. Most participants would use the two-layer design to put trash instead of anything else, because they worry about permeability and did not want any liquid leakage.

Refinement and findings: portability and additional trash disposal is attractive for users, if stability can be ensured. but the two-layer design was not used as intended.

Testing 2: A cardboard mockup of the kitchen station, trash can, and utensil props were used for conducting testing in the studio.

Refinement and findings: Some participants liked the flexibility of a portable kitchen station; however, they were worried about occupying extra space and whether it would be flimsy. During food prep, things were laid around the peripheral area on the station, which might call for a barrier or larger surface area. The relative positions of stove, sink and counter space were switch several times to observe the moving path and identify optimum storage and kitchen layout.

Testing 3: A functioning wood prototype of the station was made based on previous user research, two color-coded containers were added after user research, other props such as trash can, utensils, cookware and food props were also used. The cooking process was fully conducted with real food made. Conducted in a kitchen in a rental apartment.

Refinement and findings:

The station was relocated twice by participants to clear off the path of food preparation. Hanging function was useful; the removable trays were easy to clean but need to be more stable (more work on details), participants would not change storage layout and clean trays often, but the removable design allow different people to arrange accordingly.

Regarding ergonomics, the stability of the foldable surface needs improvement. Height of the middle shelf needs to be higher so that less bending over is required. The hanging feature was easy to reach.

Testing 4: the wood prototype with adjusted shelf height, stabilized foldable top surface. Color coded containers and some other kitchen props were used. The tests were done in a fake mini kitchen to testify usability in a small kitchen and identify the fundamental elements for the station and in a kitchen.
Refinement and findings:

This time the station was only moved at the beginning and the end due to limited space. The station was set against the corner so that it stayed out of the way. The hanging feature works from both sides. Hanging features need more work on the details so that the holes can be cleaned easily and used easily.

People tended to plan storage spaces very differently. For example, some wanted to be able to hang things on the wall, whereas some people only wanted to hanging things on the station.

Fake kitchen test

Existing kitchen test
Feedback and refinements on the organization ideas:

Color coded containers for miscellaneous storage in fridge/shelves were generally thought to be useful. Separate dishwasher trays were considered useful, and people would also put them somewhere else (e.g. on the countertop). Some participants pointed out that the soft containers could be used to store things that cannot be stacked on, and prevent losing of small things and work as fluid barriers in a bigger container.

7. Conclusion

7.1. Result of research

After the user research into experience with rental kitchens and primary research into home behaviors, alternative homes and residential mobility, it can be deducted that the trend of increasing mobility is calling for alternative home structures to fulfill the alternative resident composition in rental spaces, particularly the mostly used common areas. Rental home designs should adopt porous boundaries for both socializing and space; flexible ownership of things (private/shared/ passed on/used in turn). Rental experience could be improved by allowing free choice of interaction or isolation, differentiate or sharing of space.

Thus, the research was further focused on the rental kitchen. When the conventional structure of rental kitchen couldn’t coordinate or unify different habits and needs, issues such as chaos, limited space, hygiene issues and arguments happened. In some cases, residents even relocated their kitchen things to their own bedrooms. This not only signified a compensation for the missing territorializing and flexibility functions in kitchens, but also the adaptive potentials of kitchen. The concept of kitchen could be extended and condensed from just a big room to new possibilities like a spot for food making, a collective of cooking necessities. Iterations and testing were done to address the existing dilemmas for kitchens based on the new findings.

7.2. Result of design

The result was a mobile kitchen station with organization units that could be used in shared rental spaces. It could be used either in existing kitchens or outside of the kitchen when there’s not enough space in the kitchen or residents don’t wish to use the shared kitchen. The residents could either cook individually or use their stations together to cooperate (e.g. baking). Individual station could either be assigned to different residents or to different function areas. The kitchen station comes with two sides with hole patterns, removable racks and boxes, foldable top, wheels with brakes at the bottom.

The patterned sides could be used to hang miscellaneous things such as condiments, small cookware, utensils and trash bags. This offers quick access to tools and freedom to customize. Thus, stations used by different residents are easily differentiated and residents could rearrange according to their own habits when the station is passed on to
the new residents. Standard size wood pins could fit in the hole and used to secure things onto the wall.

The removable rack offered the same benefits by offering freedom to customize. For instance, some participants would keep all the trays whereas others would just put shopping bags at the bottom without using the trays, it’s easier for people who can’t bend over too much. The box and trays are translucent and tinted with color. The colors were an adoption of the territorializing tactic. The translucency also made it evident when the trays and boxes are dirty and reminds people to clean them. The designs of the trays and boxes are simple so that they could be easily changed when residents ask for replacements.

The foldable top adopted space saving strategies without forcing it. Some participants would keep the top open and stack things on top, whereas those with small kitchen would keep it closed. The surface is flat for easy cleaning purposes.

Refinements that could be made:

The height of the kitchen station was set so that it fits under some countertops to save space when it’s not used. However, it was still challenging for some kitchens with cabinets under the countertop. More thought is needed on placement when the station is not being used.

The hole feature needs more work on the details, so that it’s compatible with more types of hanging containers and secured easily. Pins were used to secure things onto the holes; however, they can be easily lost and may cause waste.

Final design
Different Configurations

7.3. Future research

Questions regarding the relation between homing behaviors and satisfaction for the frequent moving resident could be used as a basis for the design. A larger sample size of participants would be beneficial. More prototype tests could be done to address the refinements mentioned in the above section.

8. Bibliography


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