Goal and Context

The goal of this study is to investigate how we can improve the home cooking experience. According to Society at a Glance 2011 by OECD, 62% of Americans participate in “cooking and cleanup” (OECD). Though not exceedingly low, comparing this percentage to those of Norway or Sweden with 78% and 80% respectively shows an opportunity for improvement in the number of people who engage in home cooking. Furthermore, the United States Bureau of Labor Statistics’ food expenditure data from 2018 reveals that of the $7,923 average expenditure on food, $3,459 (or 44%) was spent on food away from home (U.S. Bureau of Labor Statistics). By picking up home cooking, people will be able to save more money. Therefore, understanding pain points and areas of improvement for home cooking might reveal new insights into why some people do not cook at home and inspire kitchen redesigns or other reforms to increase the number of people who cook at home.

The field study was conducted in the hopes of approaching this challenge by identifying current behaviors and pain points of home cooks and comparing experiences to find common patterns. The following key research questions guided this field study (see Appendix 1 for the full list):

- How are cooks using the kitchen space?
- What pain points exist in the cooking process, and why do they exist?
- What are similarities and differences between home kitchen styles?

The first and second questions investigate how the cooks interact with their kitchen space, seeking to uncover problems areas that could be addressed in a kitchen redesign. The third seeks to identify patterns that exist across differing kitchen layouts and personal habits that could serve as a basis for universal behaviors that kitchen designs should facilitate. The purpose of the research as a whole is to develop recommendations for design solutions that could improve the experience of cooking at home both for inexperienced and experienced cooks.

Method

Field research was conducted through structured observations. Using a question sheet (see Appendix 2), observations were recorded in their respective categories. Guiding questions helped focus the observations on the most relevant details pertaining to the design question.

Participants for the study were mainly selected by convenience due to stay-at-home orders mandated by the COVID-19 outbreak. As such, only one observation was done on site, with the other two being YouTube videos. In an effort to maintain the atmosphere of an on-site field observation, YouTube videos that met the following criteria were selected:

1. Video must be (mostly) continuous, meaning that cuts should be minimal.
2. Video must be around 30 minutes in length.
3. Video must show how the cook is interacting with kitchen (i.e. the video should show multiple areas of the kitchen, not just the counter).
4. The video must take place in a home setting (i.e. not a cooking show).

Considering the design goal of improving home cooking experience for all levels of expertise, participant characteristics were not screened. As such, the only criterion for a participant to be eligible is that they seem to be cooking in a home environment.

YouTube videos were observed at a computer. To keep consistent with the on-site field observation, the videos were only watched once with no pausing or rewinding. The on-site observation was conducted from a chair near the garbage bins, facing the kitchen space (see Appendix 2.3). This position allowed for maximum visibility of the observation space while avoiding physical intrusion with the cook.

The question sheet used in the observation split questions into focus areas. This included the built environment, tools and technology, demographics, and overall experience. Focusing observation on these focus areas and focus questions related to them facilitated notetaking by narrowing down the things to take not of.

After completing the field observations by hand, notes were transferred to Lucidchart, with each interesting observation assigned to one sticky note. The sticky notes were then analyzed through affinity diagramming, in which notes were organized instinctually and then assigned labels. This methodology allowed for interpretation to notes that were initially disorganized.

Results

An analysis of observations revealed common trends of working around minimal counter space, using time efficiently, and frequently cleaning the cooking area. Findings focused on analyzing the key values that cooks have through their behaviors, as well as understanding issues with the built environment. By looking at the affinity diagram, I focused on the key labels that related to the aforementioned categories. As I decided on the three key findings, I found that some observations under other labels in the affinity diagram solidified the importance of these findings and decided to incorporate them as evidence as well.

Finding 1: Keeping the Kitchen Clean

Cleanliness seemed to be a priority for the cooks alongside efficiency. Before starting cooking, the cooks ensured that the kitchen space was clean. They ensured food safety through planning food preparation and cleaning the knife and cutting board throughout the process. They washed their hands often and dried them off using a towel or on their apron. Though one cook did not video themselves washing their hands, a towel was hung up on the wall presumably for drying hands.

P1: Washed hands 3 times

P1: Frequently washed the cutting board
Finding 2: Using Time Efficiently

Cooks managed their time effectively to reduce the total time spent on cooking. Instead of cooking one step at a time, they made use of waiting time to prepare future ingredients or begin accompanying dishes. They maximized their use of space to speed up the process, such as by using all of the stove tops and freeing up counter space by using containers to temporarily store ingredients.

However, cooks also faced some challenges resulting in time loss. Two cooks spent some time searching for cooking tools. By far the largest time loss in the cooking process came from washing dishes. One cook cleaned up dishes from a previous cooking before they started, resulting in a significant time loss. Washing the cutting board and knife after each use also contributed to this time loss.

Finding 3: Minimal Counter Space

The counter space usable for cooking was minimal due to design faults as well as obstacles placed by the participant themselves. As you can see in Appendices 3.6 and 3.8, cooks used a small-sized cutting board despite the well-organized, minimalist layout. Cooks compensated for this lack of space by actions such as overlapping the cutting board with the sink or moving dishes or bowls to an open table to increase space. Even when clear of obstacles, some kitchens’ counter space only accommodated enough space for a medium-sized cutting board. Due to the inability to use multiple cutting boards at once, participants reused the same board multiple times, resulting in inefficiency. One cook had a potentially dangerous problem relating to the minimal space: due to the narrowness of the counter, the outlet with cords connected to
Prioritization

1. Keeping the Kitchen Clean
2. Using Time Efficiently
3. Minimal Counter Space

Bottom priority in this list is the lack of minimal counter space. This is because despite the lack of counter space, cooks were able to overcome this issue by making use of cutting boards. Furthermore, cooks made use of non-counter surfaces to free up extra space if needed. On the other hand, cooks’ motivations for keeping the kitchen clean and using time efficiently were placed on a higher priority because they are the core values that kitchen designs should support. Of the two findings, cleanliness was ranked higher because a lack of cleanliness poses a higher risk than time inefficiency. If cooks are time inefficient, food takes longer to prepare. On the other hand, if cooks have no regard for cleanliness, food may be dangerous to consume. This risk evaluation is the reason why I ranked cleanliness over time efficiency. I hope this prioritization of findings can be useful in discussions about how to optimize the design process.

Recommendations

Recommendation 1: Stainless Steel Counter

I believe that implementing a stainless-steel counter as seen in Observation 2 (see Appendix 2.6) is the most logical approach to improving kitchen cleanliness. As the name implies, stainless-steel counters allow for easy cleaning as opposed to other surfaces that might encounter issues with irremovable stains. As the cook demonstrated in Observation 2, the surface can be simply cleaned with a washcloth and soap. Therefore, stainless steel counters and their ease of cleaning also saves time for cooks.

Despite the practical advantage over other surfaces, however, I am weary that people may be hesitant to install stainless steel counters due to their lack of aesthetic appeal.

Recommendation 2: Advanced Dish Washing Machine

Though Observations 2 and 3 did not display dish washing in their videos, Observation 1 revealed that washing dishes was the most inefficient step that resulted in a significant increase in time spent on cooking. Considering this, I recommend the development of an “advanced” dish
washing machine that improves on current dish washers by reducing further the amount of effort the user has to expend in order to run the machine. The suggested improvements are as follows:

- Dishes are placed on a conveyer belt, rather than having to open the washer door and manually place the dishes in racks.
- The dish washer activates automatically upon placing a dish on the conveyer belt, saving energy while removing the need to turn on the dish washer.
- Be able to accommodate large items such as frying pans as they tend to take up the most space.

Recommendation 3: Specify locations to store items

This recommendation addresses keeping the kitchen clean and increasing counter space. In Observation 1’s current kitchen design, storage locations are arbitrarily chosen by the user, resulting in issues such as losing track of tools and a general sense of disorganization. By specifying locations to store dishes, cooking oil, and cooking tools, cooks can have a clearer understanding of where things are located. This will save some time from having to search for tools or free up space for cooking.

As with the first recommendation, this change might face resistance by cooks. The observed home cooks liked to improvise, and this behavior will be restricted by the implementation of defined storage locations. As such, home cooks might feel inclined to ignore the system due to the additional effort required in maintaining it.

Discussion and Reflection

In order to interpret the results of this study, it is important to consider the context in which these observations took place. Due to the COVID-19 pandemic, the kitchen at my residence was the only location at which on-site observation was possible. Observing YouTube home cooking videos introduced new limitations to the study.

The biggest limitation posed by adjustments due to the pandemic is the differing context between on-site and YouTube cooking. Considering that YouTube videos can be watched by millions of people, the cooks in these videos may have adjusted their behavior from how they would have acted in a private context. As such, a comparison of kitchen characteristics and behaviors may not be comparable across these observations. For example, cooks in the YouTube videos might not have prioritized time efficiency as much when cooking without the camera rolling.

Despite difficulties with comparing across contexts, however, the structured observation format and imposed constraints on videos allowed for a synthesis of data otherwise difficult to find connections between. By ensuring that the context for the videos match as much as possible with the on-site context, the ability to recognize patterns improved since the cooks followed a similar process. The question sheet also improved the comparability of observations by focusing notes on specific categories.

For future field research studies, I will increase the writing space on the question sheet and think of more focus questions to consider. The question sheet, though helpful, could have been
improved by reducing margins and increasing the amount of space in which to write observations. Furthermore, I made many observations that were interesting but did not necessarily conform to any of the areas of focus. To resolve this, I will try to ideate more focus questions to organize such observations. Lastly, I will bring extra paper in case I run out of space to write on.

It was interesting how many observations I could make on the YouTube videos despite having a limited field of vision (due to the camera being set in one location). Also, I found it fun to make the affinity diagrams and realize the similarities in experiences between the three contexts.

Next Steps

Based on the results and recommendations, it will be important for interview questions to focus on user behaviors of maintaining kitchen cleanliness and using time efficiently. Interviews will allow for a validation of these behaviors, and if accurate, investigate the motivations behind these behaviors. Specific questions regarding pain points in cleaning and time management may also produce new insights that could influence future design efforts.

Appendix 1: References


Appendix 2: Planning Materials

Research Questions

1. What types of food are home cooks making?
2. How are cooks using the kitchen space?
3. What steps do the cooks follow when making food?
4. How and how often do cooks clean their kitchen space?
5. What are similarities and differences among different home kitchen styles?
6. Which tools are used or unused in the cooking process?
7. What pain points exist in the cooking process, and why?
8. What pain points exist with regards to the kitchen space?
9. Which step(s) in the cooking process take the most time?
Areas of Focus

• Built environment
  o How is the space laid out?
  o What materials are used for the space?

• Tools and technology
  o What technologies are built-in to the space?
  o What technologies are visible? What technologies are hidden?

• Demographics
  o How is the cook dressed?
  o How do they interact with other people?

• Overall experience
  o How is it similar or different to other kitchen styles?
  o Are there standard behaviors/rituals shared by home cooks?

Appendix 3: Field Notes and Images
Field Observation Note Sheet

**Appendix 3.1: Field Observation 1 Page 1**

<table>
<thead>
<tr>
<th>How is the space laid out?</th>
<th>(Hand-drawn layout)</th>
</tr>
</thead>
<tbody>
<tr>
<td>What materials are used for the space?</td>
<td>- Stainless steel, frying pan, etc., marble counter - Wearing gloves and washing with warm water while food is thawing - Tissue on oven handle, paper towels (Lyny) - Rice in a box next to 2 red containers - Cooking oil in enameled, located in multiple places</td>
</tr>
<tr>
<td>What technologies are built-in to the space?</td>
<td>- Sink, oven, stove, store Frig / Light - Water left running 2 times without being used</td>
</tr>
<tr>
<td>Which technologies are visible, and which technologies are hidden?</td>
<td>- Pots - Water hidden, pot unused in cabinet / - Different sized pots/pans - Used pot (pan previous food-making), kept on stove - Using a 3rd hand, wiping slab - Used sticky notes to mark down what she needs &amp; buy later</td>
</tr>
<tr>
<td>How is the cook dressed?</td>
<td>Wearing apron, long sleeved shirt</td>
</tr>
<tr>
<td>How (if they do) do they interact with other people?</td>
<td>Talking while doing dishes, talking while cooking in general (should reassure that there is observer bang)</td>
</tr>
<tr>
<td>How is it similar or different to other kitchen styles?</td>
<td>Sometimes wash by hand, sometimes use dishwasher - First make rice - Meanwhile storing leftover food - Then de-thaw meat - &quot;want to speed time as much as possible&quot; - Then wash dishes before cooking - Transfered ready meals to plates/bowls immediately when they're done &amp; free up space - Washing hands frequently (Lyny)</td>
</tr>
<tr>
<td>Are there standard behaviors/rituals shared by home cooks?</td>
<td>Used the sink washing thing - Cleaning up while cooking, rather than after</td>
</tr>
</tbody>
</table>

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4/16
Time start: 6:03 pm
Time end: 7:02 pm
Context/setting: Kitchen in house

*Focus only on Japanese cooking*
- opened cabinets at eye level, pulled out a salt shaker & put in pot
- Lots of used & unused containers, dishes, bowls, cups left mainly on table, but also on the cooking counter
- Sticky notes are pasted on cabinet, in the left of the sink
- Meat is taking 35 minutes to thaw in microwave
- Wearing slippers while in kitchen area
- Carpet-like floor with food remains in main cooking section
- Floor beneath is hardwood

Food making:
- start w/ deboning meat
- then slice onions
- then boil eggs
- then use leftover onion pieces to use for tartar sauce [thinking of multiple uses of an ingredient before cooking!]
- Refrigerator sections are split into sections for vegetables, meat-related, etc [high/smallest anything?]

Storing & for a peeler
- there is a far function on the stove area
- Revise knife for cutting different vegetables
- Carrots stored in a paper near the stove, used after cooking them
- Setting temperature of frying pan depending on oil used (this one, set to 350 for alium)
- clean off hands using towel on stove handle
- Drawer w/ kitchen utensils left open
- Carrots used for pan thrown away after making garlic oil
- Store fan left turned off despite using frying pan — turned it on when deep frying
- Computer bin located on the counter, used to throw away garlic after used
- Humming water to herself while cutting cabbage
- Smoke sensor not visible in kitchen space
- Space for cutting limited to one space
- mixing eggs inside a rice bowl
- Used later to store tartar sauce
- Sugar in a big container (different sizes for how often used)

Recipe for main dish on phone
- Using extra space (see diagram) for cooking stops that don't require the stove
- Corner of the extra space not used — could be using the edges of the counter when making food visible

3 outlet locations (both hot & cold), out of which 1 is currently used! An extension cord in sight — connected to a rice cooker, toaster, other object that is not sure
- Photos food clothes basket (once, access to reach) — not looking further in cabinet for clothes

Appendix 3.2: Field Observation 1 Page 2
Appendix 3.3: Field Observation 1 Photo
**Field Observation Note Sheet**

**Context/setting:** YouTube video - Home cooking using home kitchen: Japanese food

**Title:** "月曜日、キッチンLittle Walkocoでわかります solar

| How is the space laid out? | Counter on left side of stove per
|---------------------------|----------------------------------|
| What materials are used for the space? | Stainless steel for counter (vs marble)
|                             | Wood for cutting board, Spoons for cooking
|                             | Glass pans for some drawers
|                             | Number on handles near stove

| What technologies are built-in to the space? | Stove, Sink
|----------------------------------------------|----------------------
| Which technologies are visible, and which technologies are hidden? | Upper: Fridge, cabinets, sink, stove, cooking tools
|                                | Oven under stove, adjustable tampo
|                                | Used measuring spoon
|                                | Used Unworked stove spots to store ingredement/seasonings, jars

| How is the cook dressed? | Simple, plain black t-shirt
|-------------------------|----------------------
| How (if they do) do they interact with other people? | Left-handed
|                                                        | Mouth open while talking
|                                                        | Wearing glasses
|                                                        | Interacting by talking to YouTube viewers - Seems unscripted

| How is it similar or different to other kitchen styles? | Bowls not in cabinets - placed on table in back
|---------------------------------------------------------|-------------------------------------------------|
| Are there standard behaviors/rituals shared by home cooks? | About the same amount of counter space used for cutting as paramount
|                                                          | Washing hands frequently - not w/ soap for实习
|                                                          | Using towels to dry off hands, also use a pron
|                                                          | Wash in knife frequently -
|                                                          | Cutting board also washed, but with soap [why different?]
|                                                          | Using edge of table for cutting and corner of table for storing/organizing

Appendix 3.4: Field Observation 2 Page 1
Appendix 3.5: Field Observation 2 Page 2

- Spent some time looking for knife that was used a min ago [hard to keep track?]
- [when do they decide to clean the cutting board/knife?]
- Using multiple bowls to store cut ingredients
- Cutting pork last because “It contaminates the cutting board”
- Unwashed board after
- Using towel to wipe off counter
- Seasoning/oil arrived on top left of counter
- “I forget things when I talk while cooking”
- Using chopsticks to separate meat chunks
- Cutting boards, cooking boards on shelf nearby
- Transferred food straight from frying pan to dishes/bowls

Appendix 3.6: Field Observation 2 Photo
### Harvard University

#### Field Observation 3

**Time start:** 4/10 11:55 pm  
**Time end:** 4/10 11:58 pm

**Context/setting:** YouTube video: Japanese home cooking - Vegan. 

- **What is the space laid out?**
  - Looks like modern? Counters smooth, white
  - Counters are about waist level
  - No cutlery or bottle for wine or olive oil (visible), but assumed based on sound of bottle opening.

- **What materials are used for the space?**
  - Wires and wires are placed on the top side of the counter.
  - Using a knife to cut how long to wait?
  - Towel hung up on left wall

- **What technologies are built-in to the space?**
  - No instances of looking for items
  - Opening packet of dried seaweed (PZ & P3)

- **Which technologies are visible, and which technologies are hidden?**
  - Long sleeved black shirt, sleeves rolled up
  - Talking with video, impromptu
  - Counter on right side of stove, right handed (doesn't matter)

- **How is the cook dressed?**
  - Cutting space overlaps with sink (not enough space!)
Appendix 3.8: Field Observation 3 Photo

Appendix 4: Images of Data Analysis
Appendix 4.1: Affinity Diagram Created from Observation Notes