M2

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Abstract. I am choosing the task of finding the shortest path for shopping a list of items in a store. Lot of time when someone goes to store with a shopping list, they end up going through different aisle searching for the product they want and end up wasting time and energy & doing things inefficiently. My main objective is to make the shopping episode comfortable and efficient by creating an interface where user can input the shopping list and store name and the app can output the shortest path to shop in the store. I will be using Naturalistic observation to go to multiple store to observe the users and their challenges during shopping. I will also use the participant observation methodology to experience myself the challenges I would face while shipping. Lastly, I will use survey to collect data points from broader user population to help me design the interface

Needfinding Plan 1

Naturalistic observation

Observations: Where, When and What

I went to Home Depot, Target and Harris Teeter to observe the task during different time of the day on 9/18 and 9/19, my raw findings from my observations and notes are below. I observed for 15-30 min in each of these stores how the shoppers carry their shopping.

Raw Notes: I found few woman not in hurry while shopping, they were checking various items but not picking them up. I also found lot of shoppers in the evening with shopping basket instead of cart and in hurry. I also saw only few shoppers in formal dresses rushing and picking few items and exiting the store. They knew where the items were and were able to exit quickly. This was more evident in Harris Teeter and Target. However in Home depot, it was

more evident that people needed more help. There were more employees to help and they were proactive in asking shoppers if they needed any help contrary to other stores. I found one shopper asking for one bakery item to store employee and he was directed to other end of the store.

At home depot Lot of shoppers were asking different help on different subjects, some were asking help on Light section, , they were not sure which bulb will fit their holder, some brought their old bulb and showed them to the store employee and asked them where they would find this replacement. Shoppers were asking recommendation on seeds and fertilizers. Shoppers were asking for help at entrance, at aisle or asking staff to page store employee to come at particular aisle. The nature of help were different, from where to find the items, comparing 2 different competitive products and asking for expert advice and recommendations. I observed one handyman asking for help on a product availability from a store employee.

Summary: Based on the timing and type of shopper, shopping patterns are different. Generally in Target and Harris Teeter, for most of the time, I did not observe shoppers asking for help or in Hurry (except in the evening). However, I did notice shoppers going back and forth the same aisle. At home depot I did see lot of people either asking for help or store employees offering to help. However, I also noticed people do not have exact item/brand in mind when they go there to shop and they go to these stores to try different combination and ask for recommendations.

Concrete steps you took to control for the biases:

Confirmation bias: I asked my wife to go to a target and record her observation. Her findings are in appendix

Also, when I saw few shoppers talking to the store employee I went closer to check if they were asking for help or were they actually asking for recommendations. I found few cases where shoppers only had back splash to buy but had not chosen which color or design and they were talking to the staff for recommendations.

Needfinding Plan 2

Participant observation

As laid out in the M1 plan, I made 2 shopping list, one for regular easy items and other for difficult items that I generally do not shop. I choose **Home depot** for **shopping list 1** and **Lowe's** for **shopping list 2** to execute my plan.

Shopping List 1: Electrical cable, Bulb, Paint, Roundup, Fescue seeds, hacksaw

Shopping List 2: Phone Wall plate, 10 amp time delay fuse and Silt fence

Raw Notes: For shopping list 1, I started my shopping with order of shopping list. I was able to easily find electrical cable from electrical section. I had to spend some time reading the specs to make sure I pick the right bulb. Buying paint spray-canister was easy and fast. Round Up and Fescue seeds were pretty easy task to pick too, it's the season for over seeding and hence they were strategically positioned. I had some difficulty for hacksaw, but I knew the section I had to go and from there I was able to find my way. However, when I saw the Hacksaw, I saw few other hack saw options that were cheaper and instead of buying the brand I had in my mind, I bought a different brand. I was offered help twice but I did not take it. I used Aisle marker/labels to guide me to relevant sections. While shopping I got 2 phone calls.

For shopping list 2, I was not offered any help while I entered the store, so I had to go and ask the store employee who was walking by. I asked about the 3rd item to him and I had tough time explaining him what I was looking for. Finally he understood and even told me its name. He finally had to ask one of his other colleague on the phone and he directed us to the right aisle. For my 1st and 2nd items, I knew it would be in electrical section, so I went there and tried finding it on my own. After trying on my own, I found a store employee who was rearranging stuff in the next aisle. I asked him for the help and he took me to the right place. Time taken around 25 minutes.

Summary: Since I started picking the items by the order of shopping list-1, I ended up repeating the sections. For example Hacksaw and cable were in contagious section, but I ended up going to that section twice at different times. Some store proactively offers help to customers because they think customer might have difficulty finding it otherwise. Overall it took around 20 min to complete my shopping list 1 and exit the store. For Shopping list 2, I definitely needed help otherwise it would have taken longer time for me to

finish the shopping. Over all, I think it took 25 min to enter and exit. Some of these stores are huge and even if you have some idea, you would still end up wasting time and energy to find the item. Having a name of the item will also result in getting help faster as I spent more time explaining what I want instead of just giving him a name and asking him a location.

Biases:

Confirmation biases: I tried not to jump to conclusion that it is difficult to find and ask help straight away except the 3rd item. For the first 2 items, I did try to find it initially but after I could not find it, asked for help store employee was just nearby. In reference to the 3rd item, I even did not knew what it was called so I thought it was best to ask help straight away. I am not sure if it was confirmation bias as I would have done the same if I was not conducting this exercise.

Needfinding Plan 3

Surveys: I created my surveys and sent to my class mates in CS6750 at Georgia tech and my friends in different cities in USA. I made sure I covered both gender, working and non-working groups too

Brief Summary and Take away: As per the raw data, I can see that 67% of the respondents do not ask for help while shopping, however, if that causes longer or inefficient shopping episode is difficult to gauge but I can at least imply that having an app will only augment their shopping experience.

52% of the respondents had shorter shopping duration of 1-30 minutes. 42% of the respondents do not do window shopping. 37% of respondents have only 1-5 items in shopping list. 90% of respondents are working people and 25% of them shop while coming back from office These all data points when taken together tells me that there are user population for whom few shopping episodes are only about how quick they can shop and exit the store.. These are the **quintessential users** for my app.

74% of the respondents either found 1 or more alternatives for the items in their list. 73% are interested in having product availability check feature on app. These two data points when taken together tells me that users would

benefit from the app. The interface can confirm product's availability, but can also give them alternatives in the store if the primary items is out of stock

Only 11% of the respondents said they will **NOT** be interested in trying for the new interface which gives us 89% of respondents interested in our app. 79% of respondents are interested in having app to show them fastest time (same or multiple store) which gives me a feeling that even though people can find the products easily in the store currently, However, they are still looking forward to try new apps which can augment and enhance their shopping experience. I can finally conclude that there is an implied under current that the app can help in making the shopping episode more efficient and comfortable for the shopper.

Data Inventory:

Users: From my data points gathered so far, my **quintessential** user would be the user who is in hurry, coming back from office and gives priority to the time. They can be of any gender or age. My Needfinding exercise does allude that working people might be more inclined to use my apps. Expert users can be potential users too for my interface as evident from the exercise.

Where the users are: My users were primarily at the store (Home Depot, Target, and Harris Teeter) doing shopping, however, they can use the interface anywhere, at store, home or office. They can generate the fastest path before they step in to the store or they can create one on a fly while shopping at the store. They could be at the cafeteria inside the store eating or drinking coffee.

What is the context of the task? My user could be doing multiple things while shopping. As evident from the need finding exercise few of the users were talking on the phone, few were trying samples (example Costco) and few were window shopping. All these activities extends the shopping episode. Few shoppers were with kids and this also caused certain focus distraction as their focus was also on supervising the kids. Some shoppers were tired as they came straight from office. Few shoppers were listening to music and hence might not be able to fully focus. It could be big sale event on a day and it could be difficult to move around in the store and also chance of product out of stock can be very high.

What are their goals? From the need finding exercise, I could infer that for few shoppers the goal was to complete their shopping list in time, for few it was not only completing the shopping list but also to check new products in the store, window shop, find alternatives or ask for recommendation for their projects. For example in Home depot shoppers were asking recommendation for their back splash project. Goal of my users is also to have a comfortable and efficient shopping episode. Another goal of the users could be to make sure all items are available in the store before they drive there.

What do they need? My users need a list of the items they need to shop, they need to know item's location in the store. They might need help in locating the items in the store. Expert or Novice, they both need proper aisle markers/labels to guide them. Some shoppers might need availability information while some need mobile to check other details while shopping. Users need some kind of medium to store their shopping list, it could be a physical paper, note in a mobile device or just remembering it in the mind.

What are their task? The main task is to shop for the item, but before that they make their shopping list by checking their inventory at home. At the store, they might have to think and resolve which section of the store the items in their list would be located. Once on a particular section, they might go through the rest of the list to see if there are any other items in the list which might be in this section of the store. They might try to find an alternative if the product they wanted is not available. They might decide to call family or friend just to get some confirmation before they buy the product.

What are the subtasks?

I think we can divide the task in to 3 basic sub tasks. Prepare shopping list, check availability & alternatives and Go to the store and shop. At first he will create shopping list, few users might validate if the products are in stock, visit the store, find the relevant sections for the items to be bought, Ask for help, find the best alternatives or different store and pick the items to complete the shopping. If he decides to use the interface, then he would need to create the shopping list and the store he wants to visit, feed it to the interface and receive the shortest path.

Defining Requirements:

The requirement of my interface would be

a) Interface to output the shortest path for the shopping list in a particular store
b) Interface should be able to read the list from a file or user should be able to type it in. The interface should be able to save the shopping list
c) Interface should suggest the stores near the user's location and save the users preferred store in its profile
d) Interface should be able to throw alerts if a product is out of stock and suggest alternatives or a different store where the product is available
e) Interface should be able to compare other nearby stores and list them in order of time needed to complete the shopping list.
f) Interface should be accessible through computers, ipads, and mobiles or at store kiosk and should run on Windows, iOS or Android.
g) Interface should help the user by suggesting the names of the product as they type the items. It should auto learn and learn from user's shopping pattern and recommend the list.
h) Interface will be used by anyone who does shopping in the store.
i) Interface should give navigation guidance like GPS gives for walking.
j) Users will need to register themselves in the app and create their user profile and password. The user data will be encrypted and stored on the devices it is being run. It will be initially offered free of cost for first 45 days and later it will be charged on a $4.99 annual fee or a onetime lifelong fee of $14.99.
k) Interface will be updated automatically via web when new version is released

Continued Needfinding:

There were some challenges with the first round of need finding exercise I did. While I was doing naturalistic observation I could only observe it from distance and not know what is going through the user's mind while he is shopping. I would like to execute following need finding exercises for my next round to overcome some of these challenges

Interview: I would like to interview few shoppers either in the store if they permit me to or few of my friends. These individuals should be 18+ and above so that they can give consent to me for taking the interview. Below would be some of the questions I would be asking them

Can you tell me about your most recent shopping episode in terms of overall comfort level? Can you elaborate any difficulties you had in the shopping? Can you explain me what steps you take to make your shopping episode efficient, comfortable and fast? Can you explain me what do you do if product is out of stock? Their thoughts on what an app should have if it needs to make their shopping experience convenient and efficient. Can you explain what kind of help you need while shopping?

Survey: The original survey was good starting point to collect the raw data points. Based on the responses I have received, I have realized that survey needs to be slightly modified to gather more specific data to help me in my need finding exercise. One thing that came affront during original survey is that everyone has different shopping patterns. One that they do regularly for regular items and one they do occasionally for items which might not be a regular items. The real benefit of the app/interface lies in this second shopping pattern. My original survey did not have any questions to catch this facet of the shopping pattern. From the original survey it was evident that lot of shoppers do shopping on weekends and holidays and they are not in hurry during these times. However, having ample time must not mean they struggle during shopping. I think I failed to ask any questions in the original survey pertaining to this facet of shopping too. There is one more facet that I realized when I was doing naturalistic observation is that lot of times people do not go to shopping with exact name of the product. They only have a need, like doing a project to replace back splash in the kitchen, but they do not know what kind of back splash they would buy. They might need a lawn mower, but might not have decided if they want to buy Honda or some other brand. They go to store and then check all the offering and then ask store employees for recommendations. I am not sure if these shoppers are my users. I do not think time is essence in these shopping patterns and hence my interface might not be an option for them.

References

1. Prof Joyner Video at Udacity
   https://classroom.udacity.com/courses/ud400
2. https://www.youtube.com/watch?v=mVHoUkQSIkU

Appendices

1. Appendix A: Needfinding plan 1 – Naturalistic Observation

Table 1. Table of Naturalistic observation findings

Store	Time	Gender		Age Group						Help	Place of help		
	Time	M	F	>18	18-29	30-39	40-49	50-64	65+		Aisle	Cell	Entry
Home Depot	Mrng	31	11	0	1	2	10	27	2	6	5	1	0
Target	Aftrn	13	38	0	6	16	7	5	4	0	0	0	0
Harris Teeter	Evng	26	41	1	8	17	26	16		0	0	0	0

Table 2. Table of Naturalistic observation findings of Partner

Store	Time	Gender		Age Group						Help	Place of help		
	Time	M	F	>18	18-29	30-39	40-49	50-64	65+		Aisle	Cell	Entry
Target	Mrng	8	26	0	4	13	7	4	6	0	0	0	0

Date ~~____~~ Time 10:30 Store Home depot

Naturalistic Observation

Notes : →

① a shopper came & exited without buying anything
    shopper = 60+ Age Gender = male.

② a shopper bought Round up & ~~check~~ window shopping if
    he needs anything else

③ Announcement on speaker for help

④ 2 people did not know what they want, checking stuff to
    decide what will perfectly fit

⑤ woman talking on phone

⑥ Couple ~~&~~ but not bought anything

⑦ talking on phone with family for help

⑧ handyman asked help at aisle

⑨ Couple elderly checking different back splash for kitchen

⑩ saw 3 people in 10 min exiting without buying anything

⑪ Lot of recommendation →at
        ⓐ Paints
        ⓑ Windows
        ⓒ Gardhes

⑫ store employees offering to help

⑬ few people asking help on bulbs (day light version)

⑭ saw store employee guiding shoppers at entrance
    not sure if he offered or they asked

Figure 1. Notes from Naturalistic observation at Home Depot
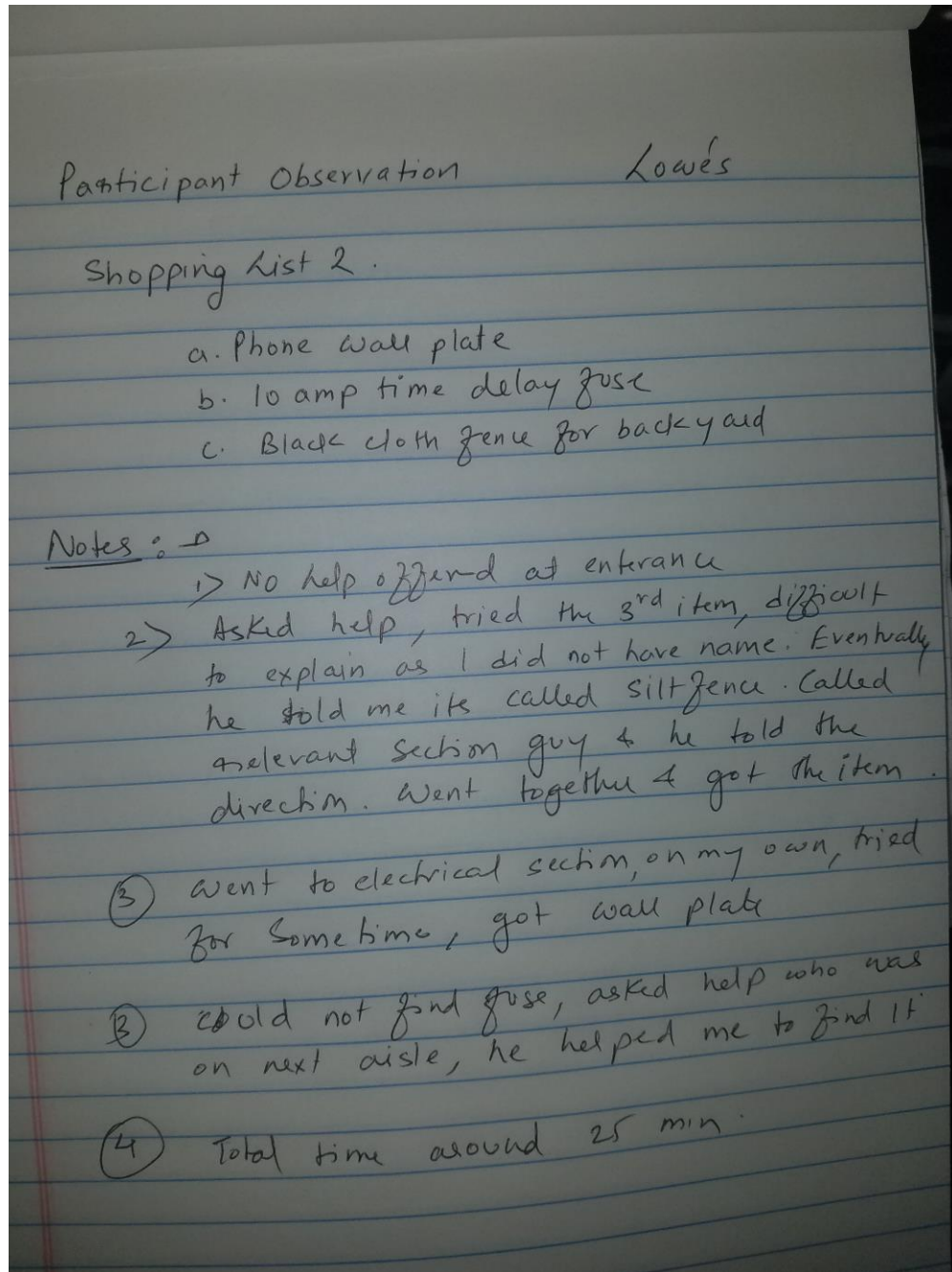
2. Appendix B: Needfinding plan 3: Participant Observation

Figure 2. Notes from Participant observation at Lowe's

3. Appendix C: Needfinding plan 3: Survey

Table 3. Table of Survey observation findings

Gender	Count
Male	48
Female	21
Declined	4

Shopper 's Categories	Count
Working	66
Student	3
Retired	0
Not Working	4

Time of the day	Count
Weekends	48
Weekdays	32
• Coming from office	18
holidays	4
Others	2

Product Availability Check	Count
Website	16
• MobileApp	6
Calling store	0
• Do not check	57
other •	2

Shopping List items	Count
1-5 items •	27
6-10 items	26
11-15 items •	10
16-20 items	5
21 items+	5

Shopping Time	Count
1-30 mins	38
• 31-60 mins •	24
61-90 mins	7
• 91-120 mins	4
121 mins+	0

Help asked	Count
Never	49
1	19
2	3
3	1
4 +	1

Difficulty	Count
1(Very easy) •	14
2(easy)	33
3 (neutral) •	24
4(hard) •	1
5 (Very hard)	1

Window Shop	Count
1-10 mins	29
• 11-20 mins	9
• 21-30 mins	2
• 31 mins +	2
• None •	31

Distraction	Count
others	29
try samples	30
music	8
Eat	9
play games	1

Alternatives	Count
Never	19
1	19
2	28
3	5
4	2
5+	7

Ease	Count
1	0
2	1
3	7
4	37
5	28

Features	Count
Fastest Time	29
Product Availability	54
Multiple store & time	29
Alternative suggestions	24

App Try	Count
Yes	45
No	8
May be	20