Assignment M1

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Abstract—This project is intended to discover, prototype, and evaluate an improved HCI design for effectively managing a grocery list while shopping. There are a handful of existing apps for this task, each of which emphasizes different capabilities and user experiences. An overall redesign of an HCI implementation for the task aims to maximize ease of use across multiple user types, while emphasizing key needs identified during the design life cycle.

1 PROBLEM SPACE

Grocery shopping is a crucial task in everyday life, with a diverse user base and experience. While at first glance, it appears to be a straightforward task, it can easily become daunting when attempting to juggle the variety of facets involved, such as meal planning, taste preferences, store layout, cost, item availability, and nutrition. This task can occur in a variety of locations - users may have access to two or three grocery stores - each with its own layout, accessibility, pricing structure, and even rush hours where navigating a cart among hundreds of other shoppers becomes an exercise in managing memory, focus, and patience.

The specific segment of the problem space that this project focuses on is the "grocery list" interface. The written grocery list has typically served as intermediary between the user and the task of grocery shopping, but this medium has several significant shortcomings, not the least of which is editing difficulties. For example, remembering to bring a pen to the grocery store along with the list in order to cross off or add newly-remembered items is less than ideal. There have been several apps developed to address the task of effectively managing a grocery list, but each has its own strengths and shortcomings, further detailed as part of the needfinding process during this project. The intended purpose of this design life cycle is to redesign the task of effectively managing a grocery list, with specific details and aspects to be further delineated as part of the need-finding process.

2 USER TYPES

For this specific segment of the problem space, there are three key user types that will be emphasized in this project, which occur namely along the vectors of age and expertise.

2.1 User Type 1

The first user type will be more inexperienced users, namely young adults. This user type will typically be 18-25 years old, either single or partnered, and has early expertise in grocery shopping (that is, without parental guidance or while living independently). Their motivations for managing a grocery list are likely focused on cost-saving, minimizing waste (if only grocery shopping for one or two people), and learning their initial recipe and taste preferences. Purchases (and consequently, grocery lists) will be smaller compared to other user types, and may be either more varied or more restrictive depending on the user's time constraints, level of income, and taste preferences.

2.2 User Type 2

The second user type will be experienced users grocery shopping for multiple individuals, namely families. This user type will typically be older (25-45 years old) and well-versed in the task. Their motivations for managing a grocery list may be focused on minimizing cost, while maximizing quantity and quality. These individuals may have a range of incomes, but typically have little time available, need to balance multiple individuals editing and having input into their grocery list, and will value a consistent list of ingredients that are kid-friendly, cheap, and fast to make.

2.3 User Type 3

The final user type will be experienced users grocery shopping for a smaller number of individuals, namely older adults (45+ years old). These users are likely readjusting to shopping for smaller households, and are highly experienced in the task of managing a grocery list, though their expertise in technology will be lower than other user types. Their motivations for managing a grocery list include emphasizing health, minimized cognitive load and physical effort (e.g. less trips and stores), and cost-savings. These users typically have long-since standardized their recipe and taste preferences, leading to a grocery list with

frequent common items and high expertise in identifying items with the lowest cost.

3 NEEDFINDING PLAN 1: NATURALISTIC OBSERVATION

The first needfinding method that will be implemented is **naturalistic observation**.

3.1 Plan for Implementation

The plan for this method is to observe users that are grocery shopping, at one common grocery store chain for the region (Harris Teeter), across three separate sessions and times. One session will be during a weekday morning, one session during a weeknight, and one session during a weekend afternoon. A variety of sessions will ensure observation of diverse user types and contexts. Lastly, I plan to take notes to ensure observations are noted during the sessions.

3.2 Data Inventory

The data I intend to gather will be observations of common user types, context and environment of the task, explicit interactions with grocery lists, and concentrated points of interest (for example, if users rarely reference a list in one section, but frequently reference a list or call other individuals for input in other sections). This needfinding exercise connects to several items from the data inventory, specifically who the users are, where the users are, the context of the task, and (broader) observations on needs and tasks (Joyner 2021a).

3.3 Potential Biases

The most significant bias to be aware of during this type of needfinding exercise is confirmation bias (Joyner 2021b). Naturalistic observation in particular risks assuming my perception is identical to the user's perception, and therefore I may expect needs, subtasks, or user types that are not necessarily salient to the true nature of the task. I plan to limit the impact of this bias by intentionally observing signs that my perception is incorrect, and to layer this needfinding exercise with additional needfinding exercises such as surveys.

An additional bias I will consider is availability bias, where the risk is overestimating the importance of events based on how easily I can access them mentally ("List of cognitive biases", 2021). This is related to utilizing multiple sessions, where I risk more heavily weighting observations from the final session.

To minimize this bias, I will utilize separate notes for each session, in effect starting from a blank slate, and ensuring that in my review I return to observations from each session more or less equally.

4 NEEDFINDING PLAN 2: ANALYSIS OF PRODUCT REVIEWS

The second needfinding method that will be implemented is **analysis of product reviews.**

3.1 Plan for Implementation

The plan for this method is to systematically analyze reviews of six existing apps that are either primarily designed as grocery list apps, or that have grocery lists as a significant feature. The existing apps are as follows:

- AnyList
- Out Of Milk
- Flipp
- Our Groceries
- Cozi Family Organizer
- List Ease

The reviews will be found via the Apple App Store website. To systematically analyze the six apps, the following metrics will be reported for each app in comparison with each other:

- Average rating (out of 5)
- Number of ratings
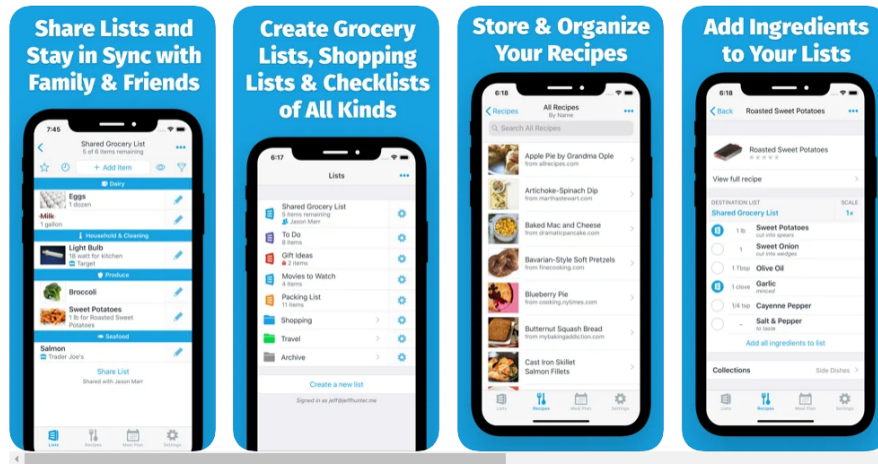- Key phrases and topics (qualitative codes) from **each of the top two** five-star, three-star, and one-star reviews of the app

Figure 1—The Apple App Store landing page for one of the specified pages, AnyList. Source: [Apple App Store](#).

Figure 2—The Apple App Store "ratings and reviews" section for one of the specified pages, AnyList. Source: [Apple App Store](#).

3.2 Data Inventory

The data I intend to gather is listed specifically above. This collection generally speaks more to the items in the data inventory that are related to the task, rather

than to the user (since reviews can easily be more or less anonymous). The aggregated data (average rating and number of ratings) allows for a quantitative review of the apps, that illuminates the qualitative data then gathered in comparison, which best speaks to the last five questions in the data inventory (Joyner 2021a):

- "What are their goals?"
- "What do they need?"
- "What are their tasks?"
- "What are their subtasks?"

3.3 Potential Biases

There are several potential biases present in this method of needfinding. First and foremost is voluntary response bias, where those with stronger opinions (either negative or positive) are more likely to complete a product review than those with neutral opinions (Joyner 2021b). In this setting, where the data has already been collected prior to analyses, the best means of mitigating this bias will be to confirm (and possibly soften) conclusions by comparing them against those from other needfinding methods listed here.

Secondly, I anticipate some level of social desirability bias as well (Joyner 2021b). Depending on the user's familiarity with the review system, they may be aware that their username as well as their feedback becomes publicly available information that the developers are able to review and respond to. While, again, the data has already been collected, the best means of mitigating this concern is by also recording qualitative codes from those with neutral (three-star) and negative (one-star) reviews, that can then be compared and contrasted against positive (five-star) reviews to check for any instances of social desirability.

4 NEEDFINDING PLAN 3: SURVEYS

The second needfinding method that will be implemented is a **survey.**

3.1 Plan for Implementation

The plan for this method is to ask a variety of questions regarding user demographics, behaviors, and methods in grocery shopping and effectively managing a grocery shopping list **(see specific survey questions in Appendix)**. The survey will be sent to Georgia Tech CS6750 students, via a class discussion

board and online peer survey tool, with the aim of receiving 25 participants for quantitative analysis purposes.

3.2 Data Inventory

The data I intend to gather is delineated in further detail in the survey questions in the appendix. The questions included cover demographics, methods for grocery lists, behaviors around grocery shopping, ranked preferences, and more. Specifically, answers to the following questions from the data inventory are addressed in the survey (Joyner 2021a):

- "Who are the users?" (demographics)
- "What is the context of the task?" (alone or with others, no. of items, etc.)
- "What do they need?" (ranked preferences)
- "What are their subtasks?" (reasons why to utilize a grocery list)

3.3 Potential Biases

The most concerning bias that may arise from this needfinding method is that of social desirability bias (Joyner 2021b). Since the survey will get into specific details around grocery list methods, participants may assume that there are "preferred answers" for how the designer would like to proceed. This can be minimized by avoiding loaded questions, by providing multiple facets of interest and opportunities for users to add categories of their own in a response, and by maximizing the use of quantitative (rather than qualitative) data within the survey.

Additionally, recall bias is a risk in this specific exercise (Joyner 2021b). Since this survey will (most likely) be completed by participants outside of the time they are completing the specific task of grocery shopping, there's a possibility that thoughts or feelings of interest to the needfinding process won't be recalled. This is slightly mitigated by some of the other needfinding exercises detailed here, but also by the inclusion of a survey question that asks when the user most recently went grocery shopping, which can help identify responses that suffer the most from recall bias.

5 REFERENCES

1. Joyner, D. A. (2021a). *Data inventory* [Video]. EdStem. https://edstem.org/us/courses/5912/lessons/14030/slides/70676

2. Joyner, D. A. (2021b). *5 tips: Avoiding bias in needfinding* [Video]. EdStem. https://edstem.org/us/courses/5912/lessons/14030/slides/70679

3. List of cognitive biases. (2021, 17 May). In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=List_of_cognitive_biases&oldid=1023582174

6 APPENDIX: SURVEY QUESTIONS

1. What is your age range?
    a. 15-25
    b. 25-35
    c. 35-45
    d. 45-55
    e. 55-65
    f. 65+
2. What is the composition of your household?
    a. Single
    b. Two people (partnership or roommate)
    c. Three people or more (families or roommates)
3. Do you typically grocery shop alone, or with others?
4. In the past month, how many times did you go grocery shopping with a list? (list zero if the answer is zero)
5. How many items are on your typical grocery list?
    a. 0-5
    b. 5-10
    c. 10-15
    d. 15-20
    e. 20-25
    f. 25-30
    g. 30+
6. What methods do you use to track your grocery list?
    a. Paper
    b. Phone (please describe): _____
    c. Other (please describe): _____
7. How satisfied are you with your chosen method on the following aspects, on a scale of 1 to 5?
    a. Ease of use, while grocery shopping
    b. Ease of use, while putting together a list

     c. Effort required to collaborate on a household grocery list

     d. Level of focus required to ensure items aren't forgotten

     e. Minimized physical effort (e.g. groups items by store layout)

     f. Cost-savings (e.g. compares brands and stores for best price)

8. Which of the following are reasons why you utilize a grocery list? **[MULTI-SELECT]**

     a. Ease of remembering items to purchase

     b. Increased speed when shopping

     c. Meal planning

     d. Minimize temptation of unnecessary purchases

     e. Cost-savings

     f. Other: _____

9. Please rank the following by how you prioritize each aspect while grocery shopping.

     a. Cost

     b. Nutrition

     c. Taste

     d. Convenience

10. If you could improve one aspect of your chosen grocery list method, what would you improve? **[FREE TEXT]**

11. When was your most recent grocery shopping trip?

     a. Today

     b. One day ago

     c. 2-3 days ago

     d. This week

     e. Two weeks ago