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# The GroceryMate: Eliciting Community Empathy and Transforming It into Purposeful Action

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**Abstract**

People who are homeless in the United States lack adequate amounts of nutritious food which is detrimental to their health. We are designing a grocery shopping assistance device that strategically requests affordable and nutritious food donations that charitable organizations need to feed the homeless. We target grocery shoppers, since doing so allows us to leverage mass participation, as well as frequent and balanced community participation. This device employs persuasive technology to elicit emotions of empathy and alter the behavior of grocery shoppers to encourage them to donate. The device provides the shopper with an enhanced, personalized shopping experience making it appealing to use.

**Keywords**

Persuasive Technology, Homelessness, Hunger, Food Insecurity, Nutrition, Grocery Shopping

**ACM Classification Keywords**

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. H.5.2. User Interfaces: User-centered design

**Introduction**

Among the many needs of human beings, the need for food is paramount [17]. To maintain good health,



**Figure 1:** Insufficient food items present at the Shalom Community Center



**Figure 2:** Special room for feeding homeless children at the Shalom Community Center

human beings require daily intake of nutritional food that conforms to dietary guidelines proposed by agencies such as the United States Department of Health and Human Services [20].

Hunger and malnutrition represent critical problems for people who are homeless. The homeless do not get adequate nutrition because they do not get enough nutritious food to eat [8][21]. On average, the homeless consume less than two meals per day [19][21]. We conducted a focus group that included a psychiatric nurse, a librarian from a local public library, and a volunteer from the Salvation Army. The psychiatric nurse and the librarian work directly with the homeless. The focus group discussion revealed that the homeless lack adequate amounts of nutritious food. Insufficient consumption of nutritious food impairs an individual's basic daily functioning, exacerbates existing health issues, and creates significant new health concerns [20]. The effects of poor nutrition, especially among the homeless, include a suppressed immune system, dental problems, gastric ulcers, cardiovascular diseases, hypertension, and chronic infection, among others [8][19][21]. Most vulnerable are homeless children, who may suffer from stunted growth, anemia, and cognitive impairments as a result of malnutrition [16].

### Current situation

The homeless do not have access to adequate facilities to prepare nutritious meals. The "soup kitchen," which serves free meals to those in need, represents the primary source of food for the majority of the homeless [8][13][21]. Charitable organizations administer soup kitchens. Such organizations receive donations and use food banks to replenish their food resources [3][7].

Due to an increase in demand for food and dwindling donations, food banks throughout the United States are unable to meet the needs of the communities they serve [2]. As a result, charitable organizations do not have adequate resources to feed sufficient amounts of nutritious food to the homeless [9]. In addition to the focus group, we also conducted a contextual inquiry with volunteers and staff at Shalom Community Center (figure 1 and 2), a local charitable organization that serves the homeless. Our focus group and contextual inquiry revealed that charitable organizations that feed the homeless struggle daily to acquire enough nutritious food items.

### *The needs of agencies that serve the homeless*

One can conclude from our research that the organizations that administer the soup kitchens are in a critical position to impact the health of the homeless. It is therefore essential that these organizations receive plentiful amounts of nutritious food.

### Our design goals

During interviews with staff from the Shalom Center and the Salvation Army, the staff expressed that their organizations can more effectively and efficiently address the needs of the homeless if they are able to manage what community members donate and how much they donate [3][7]. A Salvation Army staff member stated that there are often donations made by members of the community that do not conform to the specific needs of the homeless. Our design will provide charitable organizations with specific food items that their staff have requested. Our design goal is to create a device that leverages the power of mass participation to solicit affordable and convenient donations for food



**Figure 3:** This figure depicts the vast array of items at a grocery store

specific to the nutritional needs of the homeless whom charitable organizations serve.

#### *Addressing hunger and malnutrition via grocery shopping*

On an average, consumers in the United States shop at the grocery store two and a half times per week [10]. It is advantageous to target grocery shoppers, since doing so allows us to leverage mass participation, as well as balanced and frequent community participation. From our research, we found that ninety percent of Americans offer donations to nonprofit organizations [18]. From this, we concluded that the average American grocery shopper would be willing to contribute an affordable food donation to alleviate hunger and malnutrition among the homeless.



**Figure 4:** We used Affinity Diagramming to organize data gathered from user research

### **Persuasive Technology**

The field of Persuasive Technology holds that developers can design technology to change what people believe and what they do [11]. We can use technology to influence human actions and behaviors [15]. Human actors can respond to computing systems in a natural manner; technology can elicit positive emotional responses such as empathy [11]. Our design will apply persuasive technology to evoke empathy and compassion from the user. These emotions will provoke the user to take action and make an affordable food donation for the homeless.

### **Design Process**

Understanding the perspective and habits of the grocery shopper is critical to the development of our design. Our literature review revealed that the experience of grocery shopping is cumbersome for many because they experience difficulty locating

specific items in a grocery store (figure 3) [1]. Also, a large majority of shoppers use either a physical or a mental list when shopping [12]. Our research also indicates that approximately half of grocery store purchases are spontaneous [4][14]. We seek to extend this behavior to spontaneous donations. Our design takes into consideration the above insights as well as the fact that people are more likely to donate if there are few barriers [6].

The review of the work of B.J. Fogg encouraged us to create a device that solicits donations at an opportune point in time utilizing what he refers to as Suggestion Technology. Fogg also holds that technology can persuade through praise. Our design appropriately praises the user immediately after he or she makes a donation [11].

In addition to a contextual inquiry, interviews, and a focus group, we also engaged in several brainstorming sessions, affinity diagramming (figure 4), and story boarding to further develop our design concept.

### **Proposed Design**

Our proposed design, the GroceryMate, is light-weight, weather resistant, and detachable; it will be mounted on to a shopping cart with extendable rods for height adjustment (figure 5). The shopper can use the GroceryMate to locate items on their grocery list. The shopper can create a shopping list while using the touch-screen device, access a previously saved list, or connect to a shopping list which the shopper created online at the grocery store's website. The GroceryMate displays a dynamic map of the store. It guides the shopper through the store by identifying the location of the items on shopper's grocery list and calculating the



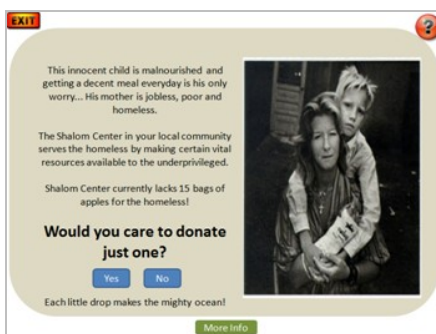
**Figure 5:** Design Sketch depicting the placement of GroceryMate on the grocery cart



**Figure 6:** Screen for choosing list type



**Figure 7:** Screen showing dynamic map of store and color-coded item mapping



**Figure 8:** Screen showing affordable donation solicitation of a nutritional food item present on the shopper's list (Photograph by Tipper Gore)

distance of the nearest possible items. The map uses a color-coding scheme to identify items on the shopper's list. The map will alter its orientation according to the change in position of the shopper. If the shopper chooses to use his or her customer card with the GroceryMate, it will provide additional benefits like product recommendations and discounts based on previous purchasing history.

As the shopper uses the device, the GroceryMate will display a picture along with information regarding homelessness. The GroceryMate will ask that a shopper donate a specific nutritional food item requested by a local charitable organization. We intend for such requests to be convenient and affordable. Each requested donation is less than five dollars. For example, if a local shelter needs 18 cans of green beans, the GroceryMate will request a shopper to donate two cans. All the willing shopper has to do is to confirm 'Yes' on the GroceryMate and he or she will be automatically billed for that item at the checkout. If the shopper uses his or her customer card, the solicitation for a donation will appear only one time for every five grocery shopping trips so as not to overwhelm the shopper. If the shopper does not use a customer card, the solicitation will appear once during the grocery shopping trip. With each donation, the database of requested items is updated to ensure that the GroceryMate requests only what is currently needed. Each week, the grocery store provides the charitable organization with a list of items donated from the community. A staff member from the charitable organization retrieves the donated food items from the store.

## Prototype

We created a low fidelity design mock up using Microsoft PowerPoint (Figure 6, 7 and 8). The prototype included a simulated interactive store map, provision to create, save, edit, and view a personal shopping list; while strategically displaying a solicitation for a food donation to agencies that feed the homeless.

## Evaluation

We conducted usability testing of the digital prototype to gauge its ease of navigation, simplicity of use, persuasive elements and level of affordance.

## Methodology

With Human Subjects Committee approval, we conducted usability testing of the digital prototype with 10 participants at Kroger, a local grocery store, with the consent of the store authorities. We selected adult participants aged 21 or above, who do not suffer from color-blindness, and who are comfortable using a touch screen. We provided the participants with a scenario of shopping for food items. We placed a laptop that displayed the digital prototype on to a grocery cart. We logged user responses in terms of locating items using the device and their reactions when solicited for an affordable and convenient donation. We used the Fly on the Wall technique and the Think Aloud Protocol to effectively log user responses on paper and audio. At the end of the usability study, the participants were asked to fill in a debriefing questionnaire and a post-test questionnaire to express their overall experience and satisfaction using the GroceryMate.

## Results

The first major finding from our usability study is that participants felt persuaded and motivated to donate

### **Qualitative Results gathered from the Usability study of GroceryMate**

"I like the fact that this device makes me aware of the immediate and specific needs of the homeless."

**Participant 6**

"Wow! This device is so much more effective in informing me of the need for nutritious food for homeless as opposed to just the donation boxes kept at the entrance of the store."

**Participant 3**

"It's unique and user-friendly! The color coordinated item locator and a flexible way of generating shopping lists was a winner for me!"

**Participant 4**

"...requesting someone to donate and acknowledging the act of donation is a great way of involving people in charity, especially, local charity!"

**Participant 7**

"Innovative idea! I would use it!"

**Participant 8**

food items. When prompted by the prototype, all participants were willing to make food donations to a local charitable organization. Many participants appreciated the opportunity to contribute to a local cause. The majority of participants indicated that they were strongly influenced by the content of the solicitation. It included a powerful image of a homeless individual, also supplemented by a brief description that emphasized the individual's need for nutritious food. Users liked the fact that the donations were convenient, affordable and would appear only once every five grocery trips.

The second major finding was that participants found the features of the GroceryMate to be helpful and appealing. Ninety percent of the participants were pleased with the prototype and enjoyed the novel experience of using an unobtrusive device that assisted them in locating products while grocery shopping. Ninety percent of participants indicated that the interface was easy to understand. Ninety percent of participants could easily view their shopping list, and could easily perform the tasks of locating the items on their shopping list.

The responses gathered from debriefing questions and the post-test questionnaires provide additional support for our design. The post test questionnaire revealed that all participants often experience difficulty locating specific items in a grocery store; seventy percent of them use either a physical or a mental list when shopping; all of the participants use a grocery store customer card when grocery shopping; and sixty percent of them would like to receive personalized promotional offers, discounts, and product recommendations based on their purchasing history.

Our findings and observations from the usability testing confirm that the GroceryMate, if implemented, will be successful in its goal of soliciting specific food donations while also enhancing the user experience of grocery shopping.

### **Feasibility of the design solution**

We foresee that the GroceryMate will have three-fold benefits: (1) it can meet the specific needs of the charitable organizations that feed the homeless by making the act of donation extremely convenient; (2) it can serve the purpose of grocery stores involved in charity and social service, who implement the device [5]; and (3) it will lead to increased product sales. We also envision that other types of stores like Target and Staples can adopt the GroceryMate and modify it to fit other fundamental needs of the homeless.

### **Conclusion**

The GroceryMate harnesses the power of mass participation through providing an effective way to solicit affordable, convenient donations from the community. By evoking empathy among grocery shoppers, the GroceryMate would improve the nutritional quality as well as quantity of food donations made to charitable organizations and thus consequently positively impact the homeless.

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