Small Donation – Big Impact:
Visualizing Charitable Donations

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Abstract

We want to encourage community engagement in charity by creating a new type of donation box. We learned that the purchasing power of food is much larger for charities than individuals. Our goal is to encourage cash donations by helping people visualize the impact of their contributions. This has two parts. First, we encourage donors with a series of videos and facts. Among these, we compare the quantity of food an individual can purchase to that of a specific charity. Second, when donors make a contribution, they see the precise quantity of food weighed on the screen in a fun interaction. This paper describes the research methods and processes used in the development of the design.

Author Keywords

Donation; Charity; Impact; Prototype; Food insecurity; Users; Food Bank; Visualization; Community; Engagement; Donor.

ACM Classification Keywords

H.5.m. [Information interfaces and presentation (e.g., HCI)]: Hypermedia. K.4.2 [Computers and society]: Social Issues. K.4.3 [Computers and society]: Organizational Impacts.

Introduction

Over 100 million pounds of food is donated to charities every year [6]. As many as 1 in 7 Americans with food insecurity rely on these types of donations for their meals [2]. However, in our research we found that donating food is not the most impactful way to support those in need. Food banks can often feed between 4 and 20 people per dollar [3]. This is much more food than an individual can contribute per dollar. In addition, if the donated food is not needed it can go bad. Cash donations are more flexible, and can be saved to purchase the correct food at the ideal moments.

There are currently many donation boxes that accept cash however, they don't show the actual impact being made. Our donation box, Small Donation – Big Impact, encourages cash donations by helping people visualize their monetary contributions. This visualization will give people the same emotional satisfaction they receive when donating real food, while being more effective and less wasteful [9]. It also passively educates people about the greater impact of cash donations compared to food donations. By doing this, we are encouraging local communities' engagement with food banks, and benefiting all the stakeholders involved. Donors maximize the impact of their donations, charities encourage new donations and increase their visibility to those in need, and the grocery stores in which the design is located leave a positive view of their businesses.

Initial Research

In our interviews with the local food bank Mother Hubbard's Cupboard (MHC), we gained insights which we confirmed through secondary research. Though food banks like MHC help a lot of people, they can always use more donations and outreach. Donations are received mainly in the 3 ways: volunteers, food, and cash. Our most important insight was that they prefer the cash donations. MHC gets up to *10 pounds of food for each dollar spent*, because of their charity status and direct relations with grocery stores. This is much more than the 1-2 pounds of food an individual can get for a dollar at the grocery store [3]. Yet, when we interviewed people, they were all surprised by this fact. How can we make people aware that their cash donations are much more effective?

Concept - Visualizing Impact

According to AV Pandey et al., visualization has a key role in affecting people's attitude and behavior [7]. By visualizing and comparing the quantity of food donated by an individual to a charity, donors will feel empowered to make monetary donations instead of food donations. To design what this would look like, we started with inspiration from other successful donation projects. In figures 1 and 2, you can see examples that encourage donations through educational and fun interactions. We wanted our design to include elements of both. If people could visualize the quantity of food donated, they will be more likely to donate cash instead of food. If the interaction is fun, they will be more likely to have a positive experience and donate repeatedly. The goal of the visualization is 2-fold: Encourage cash donations by educating people about its greater impact compared to food donations, and increase the visibility of food bank services to those in need.

Grocery Stores

Because our design needs to be accessible to all, we need a medium that is available to everyone. We considered an online service, but wanted to make sure

Figure 1 - Inspiration: This is "Social Swipe," an example of an interaction that educates donors of the impact of their donation. When they swipe their card it slices the bread, making it clear that their donation went towards food for those in need.

Figure 2 - Inspiration: This is "Spiral Donation Box," an example of a fun interaction that encourages donations. When donors insert a coin, they get the reward of seeing it spiral down the tunnel like a tornado.

Figure 2 - Initial Design Testing: Here we are testing the visual impact of food falling in our cardboard prototype.

Figure 3 – Usability Testing: We added a scale at to the box to test whether or not the impact was clearer.

our design was accessible to those without phones or internet access. A physical device in a public space would best encourage a variety of people to interact. Because everyone has to eat, nearly everyone goes to a grocery store on a semi-regular basis. Therefore, people who suffer from food insecurity will see the design, and be aware of the services the charity provides. If we put the design at the end of check out registers, those who wish to donate are likely to have their cash and cards already in hand. Putting our design after the checkout lines is also supported by the fact that many other donation boxes are in this location.

Initial Design Testing – Falling Food
Our original design idea was to let the money entered into the box turn immediately into food that falls down the screen. To test whether or not this visualization was an effective path, we created a simple cardboard prototype which you can see in figure 3. It had a heading that read "visualize the impact of your donation" to give users an understanding of what will happen when they donate. When users put money in the slots, we immediately poured food through the box into a bowl. Our objective was to test if people were impacted by the quantity of food donated per dollar contribution.

When testing, we described to users a hypothetical situation: "*You are in a grocery store after checking out, and this device catches your eye. You walk up to it and have a dollar and a quarter in hand".* We then asked them what they thought it was, and what they would do. All 4 users recognized it was a donation box. Unfortunately, none were entirely clear as to exactly what would happen when used, so they were not that motivated to try it out. However, after they put the

money in, all 4 users were visually impacted by the quantity of food that resulted. One user was slightly confused as to why the food had fallen. From this test, we learned that visualizing the food was impactful, but the intention of the design was not entirely clear before donations were inserted. We decided to have something that better explains what is happening initially, and encourages users to try it out by donating.

Ideation
To achieve these goals, we created dozens of iterations as a group. Ideas ranged from physical to digital, and simple to complex. We thought about having a digital vending machine where donors could pick out the food they are donating. This wasn't practical, as it was creating a false sense of choice for the contributor. We also sketched ideas of physical bags, that would fill with either real or plastic food as people donated. The drawback of using real food is that it could go bad, thus looking unappealing and contributing to wastefulness. The downside of something physical is that it could require extra maintenance or work, something that likely would not be available for a charity initiative. We also considered images of food falling onto plates of ready to eat meals, or bags ready to take home. However, the ready to eat food was misleading since that's not what is actually donated. Filling bags would not be visually appealing, and you can't see the actual food inside.

We ended up settling on having food fall on a scale, as it is a clear indicator of measuring quantity. We decided to create a digital design because it would require less external maintenance. In addition, it would be more flexible for the varieties of interactions that might happen.

Figure 5 - Final Design Motivation Screen: Donors are motivated by seeing the faces of those in need.

Figure 6 – Final Design Value Proposition Screen: Donors can see the increased value of their contributions to food banks.

Usability Testing – The Scale

To test the success of the scale, we used our original cardboard prototype but added a scale inside the box (figure 4). We performed this test in a local grocery store, Lucky's Market, which is actively engaged in charitable drives and expressed interest in our design. This had the advantage of testing in a similar location to the final design. We tested 4 users in the same way as before: describe the situation, ask what they think will happen, gauge their reaction to the falling food, and ask if they understood at the end.

This test reconfirmed the success of the falling food. The addition of the scale made it increasingly clear both the reason for the donation and the incredible impact of even small monetary contributions. However, some users felt measuring food quantity by weight was misleading. Because of this, we decided to measure the quantity of food by meals. In our research, we found that this is also the way most other charities measured their impact [3,4]. In summary, the addition of the scale made the overall intent of the design clearer, yet 2 of 4 users were still unmotivated to donate when first seeing it. This led to the realization that we would need something additional to encourage users to try the interaction.

Attract Mode

While iterating on how to do this, the "attract mode" of arcade games was an inspiration because they are designed to capture one's attention in a public space. We also looked towards Google's end of the year video "The Year We Asked How," and Sarah McLachlan's charitable campaigns against animal cruelty. The message of each is moving. Therefore, we decided to

follow a similar pattern of textual facts or statements accompanied by powerful videos or images.

We first thought to emphasize the statistics as they were impactful to our work on the design. However, in the book Made to Stick, a study showed that when people are in an analytical mindset, they are less likely to be charitable [5, pp. 165-168]. Because of this, we now emphasize more emotional clips like people who are hungry and the faces of those who are being helped. The facts are still displayed, but they are slightly de-emphasized.

To maximize the effect of the falling food, we used a vertical aspect ratio screen. This posed challenges when designing the attract mode. Many of our inspirations, as well as standard video footage, are in a horizontal aspect ratio. Doing additional research for inspiration on Snapchat ads and other mobile platforms gave us a better sense of the graphic design choices necessary for a vertical screen.

Final Design

Our final design has 4 screens (Figures 5-8). A loop of the first 3 forms the "attract mode." Each screen has video footage which educates donors and encourages contributions. The statistics that accompany each video are placed at the bottom, to emphasize the more emotional video footage [5]. Donors might approach this loop at any point, so we designed the order to make sense starting from each one. All 3 have the title "Small Donations, Big Impact" at the top, along with the sub-title "Visualizing your Contribution." This helps potential donors understand the concept from any screen. When a donation is inserted, the final screen immediately shows feedback of their donation's impact.

Figure 7 - Final Design Opportunity Screen: Footage of charities at work show donors the impact the charity has already made on the community.

Figure 8 – Final Design Feedback Screen: The fun interaction of food falling shows users the impact they made.

- **Motivation Screen (Figure 5) -** A video of people in need gives potential donors an emotional connection to the issue. The statistic "*1 in 8 Americans suffers from food insecurity*" quantifies why their donation is needed. Each time this screen plays will show a different clip, with a different person in need.
- **Value Proposition Screen (Figure 6) -** This screen portrays the greater impact of cash donations compared to food donations. A side by side compares one dollar of food bought by an average American, and one dollar of food bought by MHC. The statistic "Through MHC *$1 = 8.3 meals*" quantifies the impact of donations to that specific charity.
- **Opportunity Screen (Figure 7) -** Footage of people preparing donated food instills confidence that donors' money will be well spent. It is accompanied by the statistic "*MHC helps an average of 3000 people every week*" to give perspective to the work already done.
- **Feedback Screen (Figures 8-9) -** Once a person donates, they see a quantity of food equal to the amount they donated piling up on the scale. This will show a different type of food falling each time, to represent the variety of foods charities provide. Once completed, they get a thank you message. When it returns to the attract mode, they see their contribution of meals added to the total contributions.

One issue we designed for is multiple donations inserted quickly. For example, if someone inserts a dollar, the feedback screen will show the food falling. But if they insert another dollar while that video is still playing, we need to show 2 dollars' worth of food (the total donation) pile up without the current video stopping. To achieve this, we filming food falling in $.25 increments, and queue videos edited together to match the total donation. We considered addressing this problem through animated food, but chose to use real food because it is more appealing.

Evaluation
We tested the final design with a high-fidelity prototype. 4 potential donors were given a one dollar bill and two quarters. They were told they could choose to keep them, use them for the design, or both as they see fit. 3 of 4 users donated all the money. This along with verbal comments again reaffirmed the idea that the visualization feedback is fun and motivating.

Results on the effectiveness of the attract mode screens were mixed. 2 of 4 users were initially confused and expressed their preference for the screens to transition slower. It is worth noting that both of these users were not native English speakers. This may point to the fact that the text is essential to understanding. While this may not be an issue for many Americans, we want to find more clear and compelling video footage for those screens in the future.

Implementation
To move from our high-fidelity prototype to a working product will require a few additional steps. We need to film a larger quantity of food falling in $.25 increments to accommodate large donations and quick consecutive donations. Some updated footage, animation, and slower transitions in the attract mode will add to its clarity. The biggest next steps are including functional cash/card acceptors, a video control application running

Figure 9 – Final Design Feedback Screen: Once the interaction is done, a thank you message lets donors feel appreciated.

Figure 10 – Design in Action: Here is the high-fidelity prototype of our final design. We took it to the local grocery store, Lucky's Market, to film our concept video.

on a single-board computer, and an economic display panel with a strong casing to hold donations.

Once implemented our design will have a positive outcome for all stakeholders involved. Donors can maximize the effect of their contributions. Charities encourage more donations for their cause. Grocery stores get to facilitate community engagement in their stores, leaving a positive view of their business. Our goal is for a multitude of charities to adopt our design and implement them in grocery stores across the country. With this, we will empower all people to make small donations, with big impact.

Acknowledgements

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