University of California, San Diego **Global Ties**
Course **ENG 100D, Winter 2019**
Instructor **Ryan M. Mancinelli**
Project Team **Flying Groceries**

Educational Handout
Design Report
March 21, 2019

Flying Groceries

Team Members
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Monica Van, Randy Vo, Shane Gilbert

Community Partners
Client Contact **Subathra Raj, Bernice Chen**

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EXECUTIVE SUMMARY

The Flying Groceries' partner organization, the UCSD Flying Samaritans, operates a clinic in Chapultepec, Ensenada, serving locals from the community. Their patients come from primarily low-income households and often have chronic health conditions and diabetes. For lack of access to affordable transportation, these people must walk long distances to get from place to place, including their trips to the grocery store and the clinic itself.

Our design team was initially given the task of designing an easier means to carry groceries, in order to relieve the physical burden of these locals. However, further research into the problem revealed that difficulty carrying groceries was but a symptom of declining health. Coupled with diabetes resultant of malnutrition, constant walking adds to these locals' risk of foot problems and foot pains. Thus, the need our team needed to address first was not providing physical relief in the form of a device to carry groceries but solution to help this community better maintain the health of their overused, overlooked feet. In doing so, we would encourage them to better maintain their overall diabetic condition and wellbeing.

Having redefined our problem, we set out to develop potential solutions that would address these needs. From our ideation sessions, we came up with different concepts that we ideally wanted to incorporate in an integrated solution that still revolved around groceries: a sustainable grocery cart, diabetic footwear, and foot care education. However, after conducting our user tests and deliberating on our given resources and constraints, our team ultimately decided to abandon our attachment our initial groceries challenge altogether and reign in on our solution so that we could feasibly deliver it by the end of the class. Collectively, we decided that foot care education would be the most beneficial and would align best with both our partner organization's values and our community's underlying health problems. By increasing overall awareness of the importance of foot care for the diabetic patients who make up the majority of the clinic's base, our team would provide the first step required for the community to improve the health of their main means of travel: their feet.

Having converged on the concept of diabetic foot care education, our team eventually, after brainstorming different prototypes, honed in on one idea: an education flyer. We made several iterations of this flyer, and the changes were inspired by our user testing and feedback. Our final flyer, which comes in both English and Spanish, details six sections on foot care, including why it is important for diabetics, problems on the skin that patients should look out for, the recommended footwear, the recommended cleaning procedures, how to maintain the toenails, and when to seek medical attention. We ran our solution by our partners before finalizing our solution. Alongside this flyer, we have included a how-to guide that outlines the assembly, suggested usage, and maintenance of our design, so that our partners can more easily integrate our design into their current clinic practices and education sessions.

Overall, from this project, we have learned the importance of looking beyond any given problem for the underlying need--one users may not even be aware of themselves. By ensuring that we set out to solve the right problem, we can help to propose feasible, viable solutions that users will realistically use and that can help to combat not the symptoms of the community's problem but its root, which is often structural, ingrained in daily routine, and therefore often overlooked. In designing a solution that promotes an often overlooked aspect of health, our design team ultimately hopes to give our partners and partner community the initial push in recognizing and maintaining their overall wellbeing, starting from the feet up.

1. Project Management

1.1 Goals & Objectives

Our client, the UCSD Flying Samaritans, is a volunteer, non-profit organization located in Baja California, which offers free medical clinic services to community in Chapultepec, Ensenada. Their clinics support people who are affected by health issues such as diabetes or physical difficulties, such as foot pains. The UCSD Flying Samaritans operate on donations and volunteers and value any assistance they can receive to help their patients.

The initial goal of our project was to specifically design an easier means of transporting groceries in order to relieve the physical burdens that came with our users' long commutes on foot and lack of access to affordable transportation. However, after some reflection, we have adopted a more general goal: The overarching goal of our project is to design a solution that would help low-income patients of Flying Sams with their prevailing physical issues and diabetes. This solution may encompass physical accessories and new systematic approaches to promote overall health. We aim to have a solution ready, by the end of the quarter (March 2019). Our design will be presentable so that our partner organization can implement our solution to reduce the challenges our community of end-users face everyday. Our intended solution will apply the aspects of sustainable community development projects. Furthermore, we seek to create a solution that can expand beyond our user demographics of the Flying Sams patients and to the larger Ensenada community, so that we can promote the wellbeing of the entire community, rather than just a small subset of users. By tackling the topic of health, we ultimately hope to provide a useful solution that addresses this core need in the community and to support our partner organization, Flying Sams, in their health-conscious mission in Ensenada.

1.2 Approach

Due to geographic separation and language barriers, our target community, Chapultepec, Ensenada, is difficult to access. Thus, our strategy for data collection will come from not from our end-users but from interviews with clients and from field observations. We also aim to interview other groups of people who have similar difficulties that our target community faces, namely people with physical difficulties or their family members. Additionally, we will conduct interviews with relevant experts, such as the members of UCSD Flying Samaritans, in order to better understand the community of Chapultepec. Another strategy we will employ is gathering survey data from questionnaires sent to the Chapultepec community, which will be facilitated by UCSD Flying Samaritans in their monthly trips to their medical clinic. The tools we will use to facilitate effective teamwork and management are Google Drive for collaborative file sharing, Facebook Messenger for team communication, and Trello for keeping track of goals via project boards. Lastly, we intend to revise and update our approach throughout our project, especially in the accommodation of new insights and changes to our design focus.

Intended Project Management Strategies:

- Finalize Project Details

We will define the scope of the project, including the various roles and responsibilities of team members, and develop a detailed plan and define goals, then create measurable criteria for success in the form of a usable, feasible, and sustainable solution. We will factor in deliverable dates and create a timeline to which we will adhere.

- Set Clear Expectations

We will make sure that we each know what our roles are and what is expected from each of us as team members. This is to keep everyone accountable for their portion of the project, so that our overall project completed according to our set timeline.

- Establish Clear Communication

We will ensure that every member of the team gets notified of important announcements and events pertaining to the project. We will keep a status report of the progression of the project and will regularly check in with stakeholders, getting frequent user playbacks to ensure that our design meets their needs.

Our Initial Research Participants:

- **Garrick Johnson (UCSD Flying Samaritans Co-President)**: Interviewed by Allen Chiang in-person at UC San Diego Price Center.
- **Jorge Hernandez (Person with walking disability)**: Interviewed by Randy Vo over Skype.
- **Dolores Peckham (Roger's Market Career Worker)**: Interviewed by Francis Macapinlac in-person at Roger's Market Office at UCSD
- **Joseph Song (Person recently in crutches):** Interviewed by Jason Lu in-person at Village West Building 3.
- **Tim Lee (Son of Person with Arthritis)**: Interviewed by Monica Van in-person at UCSD Geisel Library.
- **Subathra Raj (UCSD Flying Samaritans Co-President)**: Interviewed by Monica Van in-person at Commuter Lounge.
- **Bernice Chen (UCSD Flying Samaritans Publicity Chair):** Interviewed by Jason Lu, Allen Chiang, and Monica Van in the Loft.

Our Preliminary Client Interview Questions:

*Note: *We have yet to pivot from our initial groceries design challenge at this point in time.*

- What are the conditions like in Ensenada? (infrastructure, economy, weather, natural resources, etc.)
- Who are we designing for? What problems do they face? (physical, financial, etc.)What skills do they have?
- In what ways is carrying groceries a problem in this community?
- What has been done before to solve this problem?
- What are the general concerns in this community that our design should tackle?

Relevant Experts:

- How is the area in the Chapultepec community? Are the roads paved? What is the distance between the community and local businesses?
- What specific health conditions do your patients have?
- What resources are available in Chapultepec that the local community has access to (businesses, government assistance, etc.)?
- What is the normal background of a person that visits your clinic (Economic, cultural, etc.)?

1.3 Schedule

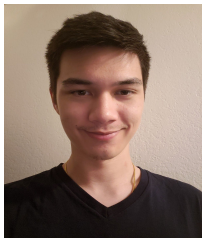
The major phases of our project were research, analysis, testing, and implementation. We utilized a Gantt chart to coordinate our group contributions to keep track of our progress throughout each week. We conducted research by observing and interviewing our primary stakeholders to discover their point of view and needs. We analyzed our research to develop a feasible design solution which we then tested on our stakeholders and received feedback which we iterated upon. And finally, we proposed a plan of implementing our design solution within the community itself.

PROJECT TITLE	Flying Sams - Groceries
PROJECT MANAGER	Shane Gilbert

TASK TITLE	TASK OWNER	START DATE	DUE DATE	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11
Team Contract	Team	1/25/19	1/29/19									
Project Management Draft	Team	1/27/19	2/3/19									
Problem Definition	Team	2/8/19	2/10/19									
WiPP Slides	Team	2/15/19	2/18/19									
Concepts	Team	2/19/19	2/24/19									
Analysis & Testing	Team	2/25/19	3/3/19									
Design	Team	3/7/19	3/10/19									
Implementation & Impact	Team	3/12/19	3/17/19									
Final Report	Team	3/14/19	3/17/19									

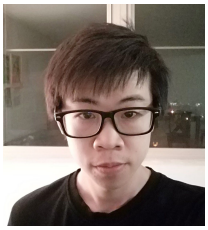
Figure 1.1 - Gantt Chart

1.4 Team Bios



Shane Gilbert - Team Leader
sdgilber@ucsd.edu
4th Year, Graduating Spring 2019
Major: Cognitive Science (Human-Computer Interaction)
In charge of ensuring team goals/assignments get completed in a timely manner as well as promote a positive team atmosphere.
Shane has experience in human-centered design, design prototyping and with users.

Allen Chiang - Project Manager
akchiang@ucsd.edu
4th Year, Graduating Spring 2019
Major: Cognitive Science (Human-Computer Interaction)
Responsible for team organization and assist in managing project deadlines. Allen comes from a software engineering background with multiple software development projects targeting effective user experience and interaction.

	**Monica Van - Secretary** mpvan@ucsd.edu 2nd Year, Graduating Spring 2021 Major: Cognitive Science (Machine Learning) As the secretary, Monica records the meeting minutes and keeps track of attendance. She helps the team to empathize with the end-users, since her hometown community closely resembles that of Ensenada.
	**Randy Vo - Facilitator** ravo@ucsd.edu 4th Year, Graduating Spring 2020 Major: Computer Science As the facilitator, Randy regulates communication so that it remains relevant to project goals. Randy has experience with working on software development projects.
	**Francis Macapinlac - Researcher** fmacapin@ucsd.edu 2nd Year, Graduating Spring 2021 Major: Electrical Engineering As the researcher, Francis gathers as much background information on the Flying Sams, the community of Chapultepec, groceries, and previous carrying devices. All relevant information helps the team contextualize the issue they are facing.
	**Jason Lu - Partner Liaison** jalu@ucsd.edu 3rd Year, Graduating Spring 2020 Major: Computer Science As the partner liaison, Jason maintains active communication with our partners and clients to ensure that the objectives are thoroughly met. He ensures that the team can translate client needs to actionable goals for the project.

1.5 Stakeholder Analysis

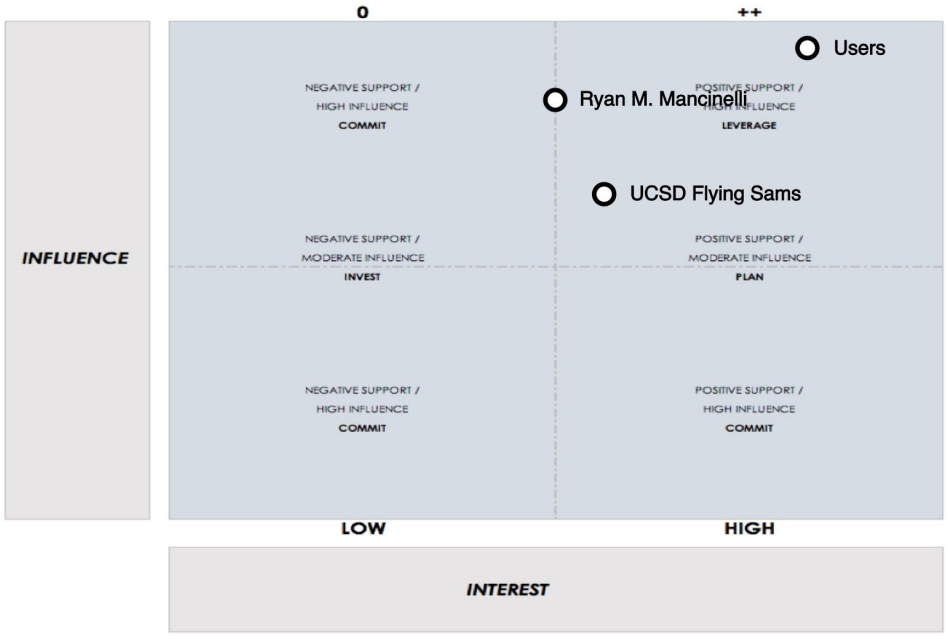


Figure 1.2 - Stakeholder Analysis Matrix

UCSD Flying Sams (Ally): Our project team has been partnered with the Flying Samaritans' UCSD branch. Since we work with their organization and members through the quarter, it is important to satisfy their needs and to keep in close contact.

Ryan M. Mancinelli (Ally): Professor Mancinelli teaches the ENG 100D: Design for Development class for Winter Quarter 2019. He and his teaching assistants have assigned the students their projects for the quarter. In lecture, he gives us knowledge about human-centered design which is vital to the success of our projects. He has a high interest in all the class' projects and high influence on the project's progress and completion.

End-Users (Ally): Our main end-users are the patients who frequent the Flying Sams clinics, who often suffer from physical disabilities or diabetes. The specific persona for this end-user is a low-income, female senior resident of Ensenada, Mexico, between the ages of 40 and 65, who has diabetes and has to walk long distances or for long periods of time. These end-users have high influence, because their circumstances and needs will determine how we will design our solution, and they will have high interest in a solution that helps them deal with their diabetes. Another one of our potential end-users would be the doctors at the Flying Sams, who would likely play a role in helping us to implement our health-conscious solution. They would have a high interest in promoting the overall health of their diabetic patients, as this is their goal as a healthcare provider. Thus, they would be an ally to our cause.

2. Problem Definition

2.1 Problem Statement

The diabetic patients of the UC Flying Samaritans medical clinic in Chapultepec, Ensenada need a better way to maintain the health of their feet because they rely on their feet to walk long distances and because their diabetes causes frequent foot problems.

2.2 Background & Context

Our initial research actually focused on our initial groceries problem: Carrying groceries is physically taxing for the poor locals of Ensenada, who struggle to commute long distances due to chronic corporeal paints. However, the research we conducted for this initial challenge would eventually inform the broader redefinition of our problem (see Section 2.1) later down the road.

From our research, we gathered that the patients who frequent the UCSD FLying Samaritans clinics have several structural problems. Because of their low socio-economics status, these people rely on the healthcare services provided by the clinic and cannot afford frequent public transportation or access to a car. Thus, they resort to walking for uncomfortably long periods of time while carrying their heavy groceries despite their health conditions. Many of these health conditions consist primarily of diabetes, leg pains, and bad leg circulation.

According to Garrick Johnson, the UCSD Flying Sams Co-President, the locals in Ensenada visit the clinic in order to receive check-ups, medicine, education, and other medical or dental advice. Bernice Chen, the Flying Sams Publicity Chair, says that there are about 20 to 30 people who frequent the clinic, and they often heed the advice they receive from the professionals at the clinic. In addition to grocery shoppers with leg pains, there are those who struggle to walk due to injury or disease, and they likewise struggle to carry heavy objects, including groceries. While the population of Ensenada exceeds 410,000, the population we will design for will be narrowed down to the clinic visitors and their specific needs regarding grocery shopping and travel.

The affected, poor community of Ensenada often cannot public transportation or access to cars. While locals have access to electricity, they have very little technological capabilities. In terms of infrastructure, the YouTube primary source taken by MoitosTv, "Ex Ejido Chapultepec - Ensenada , B.C. México" demonstrates that the roads in Ensenada are mostly paved and flat; this fact has been verified by Bernice, Garrick, and Subathra. According to Subathra, politically, while universal healthcare is available in Mexico, the services provided for the poor communities are inadequate, they truly only have access to free clinics like Flying Sams.

In regards to education, many people in Chapultepec only speak Spanish and many only ever continue to junior high school. Physiologically, much of the community suffers from chronic health conditions, such as diabetes, bad blood circulation, limb loss, and other physical challenges that make mobility difficult and/or uncomfortable. Still, the clinic is limited in its financial flexibility and provisions for the local community, since it operates based on donations and volunteers.

In terms of the greater Baja California, in which Ensenada is located, the economy consists of jobs in agriculture, maquiladoras (manufacturing assembly plants), mining and tourism but unemployment also affects many Mexican families, many families are at or below the poverty line. According to "Culture", it is not uncommon to see people living in cardboard boxes, trailers, and on the streets. Mexico's culture is an assimilation of different traditions,

namely Indian and Spanish: "strong Spanish influence, and a diminishing Mayan Indian influence".

At its core, the problem is less an issue about carrying groceries and more about historical health and poverty issues in Mexico. Diabetes is a long running health issue in Mexicans as their cultural diet consists of high carbohydrate content in their tortillas, as well as high sugar content in their juices and sodas as they often lack a source of clean water. Health issues like this contribute to general difficulties with physical activities. Mexico's historical troubles with social and economic relations with the United States caused an increase in unemployment which contributes to poverty in many regions. Unemployment has many implications for communities such as a stagnation or fall of the economy which then creates issues like a lack of personal and mass public transportation in Chapultepec. Regarding the issue of carrying groceries or any large size or quantity of an object, through the centuries people have gone from carrying things with their bare hands to bags, carts, and vehicles. According to Joseph Song, a university student on crutches, he has to buy less per grocery trip but also go on more because of his physical limitations. At a local San Diego market, manager Dolores Peckham says they provide paper or reusable shopping bags, and for larger purchases there are plastic baskets and large grocery carts available. In recent years there has been more movement to reduce the use of plastic bags as research has found there to be an "uncertainty and sensitivity in the carbon footprint of shopping bags" and that "plastic bags can create severe environmental problems due to their inability to biodegrade." Alongside the long-term environmental and sustainability concerns, the health of the community will continue to deteriorate, making it harder for those in the community to walk around and do physical activities.

Immediate drivers to the problem are the current footwear and lack of foot care education in communities like Chapultepec. The most common footwear observed in the Ensenada community are sandals called "huaraches" made out of recycled tires, which are unsuitable for long commutes and for those who have health conditions like diabetes and bad circulation. In addition to the footwear, foot care is just as important, but in communities like Chapultepec there is a lack of education regarding proper foot care and footwear. In Mexico, a study has found "hypertension is one of the most prevalent chronic diseases" and since the start of the century there has been over a 25% increase. Another prevalent health is diabetes which recently has been found to be the leading cause of health related deaths in Mexico. Research on diabetes in Mexico has revealed this issue as a structural condition because type 2 diabetes is called a "lifestyle disease" as it caused by obesity, their cultural diet, inability to afford medications, and other health care issues. The cultural diet is an important part of Mexico's structure. Improper diets caused by lack of education and inability to afford healthier is also accompanied with the face that perishable foods have a much shorter shelf life in Mexico than in the US because they do not have any preservatives. This deters people from buying healthier foods like fruits and vegetables. . There are many grocery stores that sell different things. This causes people to have to make several trips, causing them to have to walk more. Finally, with increasing urbanization, Mexico's population is also getting older and also "Mexican families are smaller than ever," which is an issue to such a disproportionately large older population.

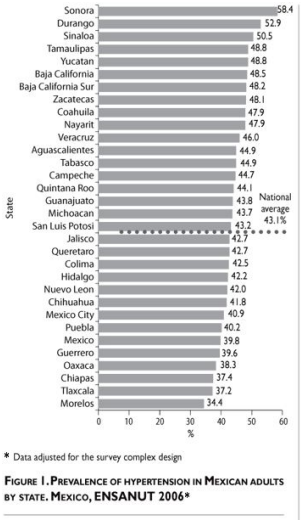


Figure 2.1 - Hypertension in Mexican Adults by State

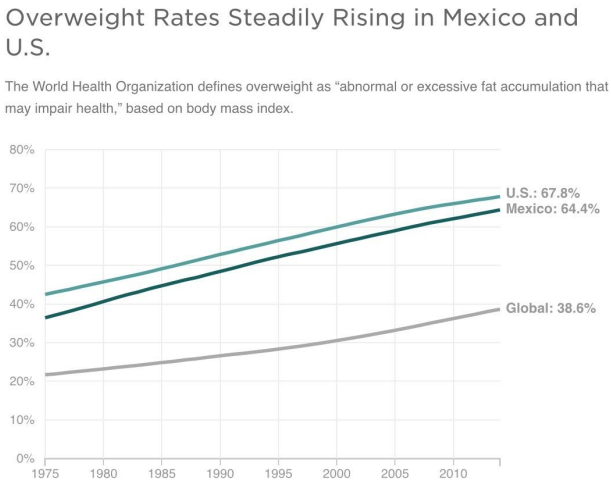


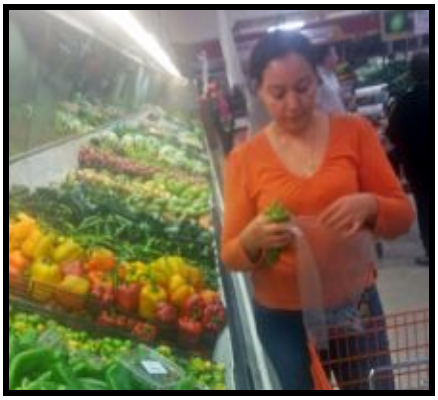
Figure 2.2 - Obesity Rates in Mexico and USA

Some of the resources and capacities that the Ensenada community has access to would be the Flying Sams clinics and volunteers themselves. The clinic already provides education for the locals regarding health problem, and the locals often heed the advice offered. Therefore, the community's trust in the clinic can be leveraged to address our design challenge, namely in the form of education relevant to maintaining physical health while travelling long distances or while carrying heavy items. Also, as can be witnessed in the YouTube video taken in Ensenada, Roberto Viajero walks the viewer through the *tiendas* in Ensenada, which showcase the vendors' craft skills like sculpting and knitting. To corroborate this primary source, Subathra has also mentioned that the locals have the skill to sculpt figurines out of recycled tires. These craft skills also extend to their clothing, since many people in the poorer communities in Mexico, especially the females, often wear traditional sandals called *huaraches*, which is often handcrafted using "rubber tires and cloth". In addition to its craft skills and excess rubber tires, this community also has access to wood scraps that might be useful for our solution (Garrick Johnson).

Figure 2.3 - An image of a traditional huarache.

2.3 User Profile(s)

Persona 1 - Elderly/Middle-aged Diabetic Woman - Maria



Bio: Maria is a married, primary-school educated stay-at-home mom and has to care for three children. She suffers from type-B diabetes as well as hypertension, so she must constantly monitor her blood sugar levels along with limiting her own physical exertion in order to avoid straining herself too much. Her husband works as a day laborer and must commute to work daily while Maria remains at home. On top of cooking all the meals for the entire family, every week Maria makes two solo-trips to her local supermarket a mile away from her home. Because money is tight, she shops from store to store to find the best deals, as well as needing to walk another mile back from the stores to her house. As a diabetic, her greatest difficulty is being on her feet for extended periods of time - which she has to endure in order to properly support her family. She wants to find a way to make grocery shopping faster, easier, and more reliable.

Age: 45 | **Work:** Stay-at-home mom taking care of 3 children aged between 6-10 years old.
Location: Chapultepec, Ensenada, Mexico

Figure 2.4 - Maria

Table 2.1 Elderly User Empathy Map

Say • "I want a better way to bring groceries home without being so tired from it." • "I don't have access to transportation since we can't afford it."	**Think** • The journey of acquiring groceries is an inexplicit problem that should be addressed. • I want to be able to know the best deals without having to walk around so much.
Do • Walk a lot to get to every store to buy everything that they need. • Frequently takes resting breaks on her trips to the store. • Takes multiple trips each week to feed her family.	**Feel** • Sometimes pain, from hypertension. • Tired from the heat of the sun and traveling. • Unmotivated to take multiple trips.

Relevant Knowledge: Due to her role within her household, she has learned how to effectively time-manage the daily chores and tasks that need to be done in order to support her family. She is also great at organization and planning, as her trips to the grocery store requires her to determine what is the best plan to find grocery sales in order to save money while also putting food on the table. While her socio-economic background puts her family at a disadvantage, they have adapted to this through a lot of DIY tools and furniture at home, such as homemade chairs and clothing.

Journey Map:

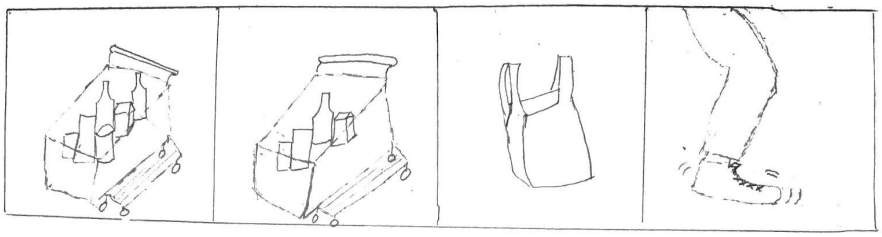


Figure 2.5 - Current Journey Map For Maria

Persona 2 - One of the healthcare providers - Dr. Hernandez

Bio: Dr.Hernandez is a healthcare provider that works at the partnering clinic in Chapultepec, Ensenada, Mexico. This clinic subsidizes food for families twice a month for families that face food insecurity and are seeking assistance. Many members of the community face common socio-economic problems that limit their ability to attain food on demand. Others face physical limitations that attribute to the same problem. Dr.Hernandez is aware of these issues and wants to help families by promoting health education. He wants to reduce the factors that contribute to food insecurity by using his medical expertise to make the grocery trip more accessible. Through proper education, the families will see positive results in lower food waste and better traveling experiences.

Age: 35 | **Work**: Healthcare provider
Location: Chapultepec, Ensenada, Mexico

Figure 2.6 - Dr.Hernandez

Table 2.2 Doctor Empathy Map

Say "Taking care of one's personal health can often be the root to many other problems."	**Think** If people put in effort to make positive changes in their physical health, it could spiral into other positive experiences.
Do Provides healthcare and education to his patients. Works with them to stimulate healthy lifestyles.	**Feel** Health is just as important as any other social necessity.

Relevant Knowledge: Dr. Hernandez studied at the National Autonomous University of Mexico, regarded as one of the best universities for research in Mexico. He received his doctorate degree fairly recently and is notably educated in diabetic healthcare. He is available to provide any informational need and can take one-on-one appointments for patients that want further insight.

Journey Map:

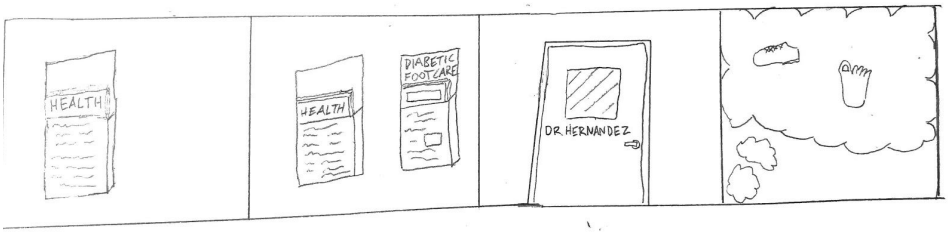


Figure 2.7 - Current Journey Map for Dr.Hernandez

2.4 Design Requirements

Table 2.3 - Measurable Design Requirements

Criterion	Requirement	Primary/Secondary
Sustainability	The design should be sustainable, meaning it can be used in the long-term by more than one individual. It should also easily maintainable.	Secondary
Flexibility/ Adaptability	The design should be adaptable to different settings, being usable in both the clinic or in the community, as well as at home.	Secondary
Affordability	The cost of the designed product needs to be low, preferably $5 or less for the clinic and user to make or purchase.	Primary
Usability	The design should be simple to use, understandable, and applicable to the users' daily commuting and diabetic lifestyles. The determined users should be able to refer to it as a routine part of their life if necessary.	Primary
Accessibility	The design should be accessible to people with physical difficulties and diabetes, as well as the clinic and broader Ensenada community. The design should not require extensive time commitment to make, use, or implement.	Secondary

3. Concepts

3.1 Existing Solutions Analysis

Cart

Pros: Already precedent of use in this community, so people already comfortable with using it, and it relieves the burden of carrying heavy groceries.
Cons: Expensive, doesn't address discomfort of walking for too long, short-term. Once it is stolen or breaks down, it cannot be replaced using available resources. Time-consuming to make from available resources.

Figure 3.1 - Grocery cart

Compression socks

Pros: Good for circulation, which many Flying Sams patients suffer from, available in community at Walmart.
Cons: Not culturally used, not practical to have every time someone needs to go shopping. Expensive to purchase for every user of the clinic. Doesn't solve arch support

Figure 3.2 - Compression socks

Insoles

Pros: adaptable to user's foot form and footwear, comfortable, subtle and desirable.
Cons: Expensive, easy to cause irreversible damage to the insoles, does not fit the form factor of sandals, need to replace regularly. Requires some understanding to ensure proper fit

Figure 3.3 - Insoles

Infographics

Pros: visually aesthetic, cheap to mass produce, easy to implement given Flying Sams' current resources and experience, reduces the chances of the problem from occurring in the future, promotes healthy lifestyle, adaptable to multiple user demographics (children to seniors).
Cons: requires cognitive participation, requires two parties to be involved, in English, requires a lot of time to be translated to Spanish, provides no instant physical relief.

Figure 3.4 - Foot care infographic

Diabetic shoes

Pros: Good for foot care, good for health conditions, is not limited by the grocery shopping landscape and can be used as an everyday accessory.
Cons: Expensive, not aesthetically pleasant, does not relieve the strain on the upper body when carrying groceries.

Figure 3.5 - Diabetic shoe

Many of the above solutions require money to obtain and are often seen as accessories. The core user base that we are trying to reach out to don't have a lot of money to spend on things they don't deem necessary. The users need a way to make carrying groceries easier on their bodies, but if we give the users a cart, their foot pain will only be resolved temporarily. Solutions such as insoles, better shoes, and socks are not a feasible option either because they are a first order solution to the core problem of the foot pains. It is not feasible to provide these solutions to the users because they won't know how it helps them and won't learn how to fix the issue at the root cause. The best solution would be a second order fix and, in this case, education. The solution for the most impact will revolve around educating our users on the best way to maintain their foot health and how to make better purchasing decisions for foot health.

3.2 Concept Generation

Name: Cart Me Away

Tagline: A simple-to-use cart for transporting groceries from place to place.
Core Need: Target users currently suffer from physical strain when carrying groceries back home from their trips to the grocery stores. Cart will be able to hold and transport the groceries, so the users will be relieved from most of the strain.
Strengths: Physically carries the groceries for the user.

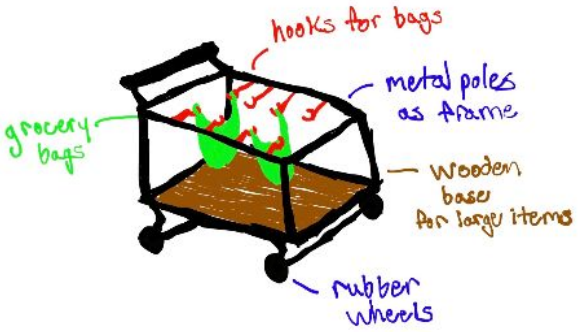


Figure 3.6 - Cart Me Away Design

Weaknesses: It would be expensive to produce a quality cart and would require the users to use their own time and resources to build their own. If it breaks, it would not be easy to replace. Doesn't solve the issue of foot pain due to walking. Still requires physical strength to push/pull the cart around.

Name: Internal Heeling

Tagline: A pair of makeshift insoles that would improve the foot health of the users by providing support and comfort.
Core Need: Users do not have proper foot support and need a way to make walking more bearable.
Strengths: Relieves some of the user's foot pain and provides better support than their current shoe options, which are sandals.
Weaknesses: Is not compatible with their preferred form of footwear (sandals). Can get worn out quickly and would need to be replaced regularly.

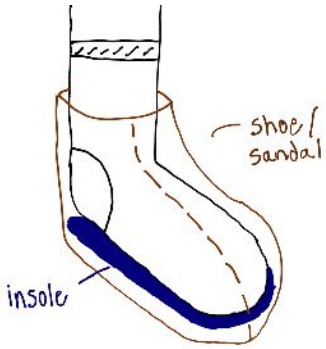


Figure 3.7 - Internal Heeling

Name: Education on the Right Foot

Tagline: A brochure or pamphlet to educate the users on proper foot care.
Core Need: Users are not educated on proper foot care and suffer from foot pains when they walk to and from grocery stores.
Strengths: Is cheap to mass produce since it only requires being printed out by the educator or clinic. The only cost is the cost of paper and ink.
Weaknesses: Needs to be translated to Spanish since none of us speak it fluently. This can be very time consuming. Does not provide immediate pain relief. User may not use information effectively.

Figure 3.8 - Education on the Right Foot

3.3 Concept Evaluation & Selection

Since our team was unable to secure any funding for possible solutions, we needed a new approach to how we would provide a viable solution. The solution would need to be cheap for anyone to make, require little time to prepare and solve the core issues. The shopping cart solution is not a cheap and viable option since the materials to create such a solution would cost far more than anyone would be willing to pay. The shopping cart would also require several hours to build from a user standpoint. The insole option would also require money to be created which, again, we nor the users have.

Based on our research of the core needs of our users and its viability, we determined that education on proper foot care was the best solution. It is cheap to reproduce and would only cost the price of paper and ink. It is very easy to make requiring several minutes to load up the design onto a computer and printing it out and would solve the core need by teaching the users how to better take care of their feet, resulting in more comfortable walking. The clinic already educates their users on health care, therefore, education on proper shoes and foot care would be easy for them to incorporate into their curriculum.

Design Requirements:

- Affordability: should cost the clinic and or user less than $1 to make/purchase.
- Usability: should be understandable and applicable to lifestyle/occupation/clinic practices.
- Adaptable: should be usable in clinic as well as the home.
- Sustainability: can be used in the long-term by more than one individual; can be easily and cheaply reproduced.
- Aesthetics: averages at least a 3 on visual appeal using a Likert scale from 1 (least appealing) to 5 (most appealing, would definitely use) so that user would want to use it.
- Quickly accessible: does not require much time commitment out of daily routine to implement/use/make solution.
- Durability: should always work the way it is intended. Information can be updated easily if needed. Cart and Insoles are made with quality.

Before user testing our prototypes, we were able to retrieve some rudimentary feedback from our stakeholders concerning our concepts, which we summarized in the following capture grids:

Table 3.1: **Cart Me Away** Capture Grid

What's good?	**Changes to Suggest?**
• Helps to reduce physical strain Easy/Simple/Doesn't take much learning to use. • "I like the idea of having hooks to hang grocery bags from."	• Cheaper materials? • Make less expensive/ find cheaper materials/carts. • "Perhaps adding boundaries around the 4 cart walls to keep the larger items from sliding off."
Questions/Concerns?	**Ideas to Suggest?**
• Expensive if simply purchased. • Manual labor involved in making one themselves might introduce more problems. • Time involved in making DIY cart • "How much would this product cost?"	• Implement this with another solution that addresses transportation • "A thought I have to keep in mind for the wheels is that the roads they would be rolling the cart on are often uneven and rocky."

Table 3.2: **Internal Heeling** Capture Grid

What's good?	**Changes to Suggest?**
• Cheap to produce. • Potentially good for diabetic feet. • "I like this idea over the shoe idea that was discussed. It seems more cost efficient overall."	• Focus more on sandals, since demographic of patients prefers sandals over shoes. • "Would need more info about what specifically about these insoles would be beneficial to diabetics."
Questions/Concerns?	**Ideas to Suggest?**
• Keep in mind the cultural differences in Ensenada. • Might not actually help people with missing limbs/amputated legs. • Will they have to keep making new ones once the old one wears out? • "As mentioned, that this insole is only compatible with shoes and not sandals. What is special about these insoles?"	• Look into compression socks for athletes. • Make better shoe soles out of tires, since some locals already know how to manipulate rubber/ use them for footwear. • "Making this compatible with sandals, perhaps using glue and cutting."

Table 3.3: **Education on the Right Foot** Capture Grid

What's good?	**Changes to Suggest?**
• Beneficial to clients to learn more about how to take care of their feet. • Good for diabetics. • Can print a bunch for free. • "Cheap to produce, easy to distribute".	• Maybe add tips that can be applied to any of the patients, ie young kids, and not just adults with foot pains. • "Also incorporating foot pain management tips in the brochure."
Questions/Concerns?	**Ideas to Suggest?**
• How will you translate this? • How easy would it be for the healthcare professionals to learn and teach? • What if the patients just throw away the brochure? • "What/who would be the sources for the information in this brochure?"	• Add something like a poster board or wallpaper that doctors can keep in the office. • Include more procedures/actions to learn, rather than just information. • "Potentially having these translated by someone else in the class who is fluent in Spanish?"

Table 3.4 - Pugh Chart

Criteria	**Weight**	**Makeshift Grocery Cart (baseline)**	**Makeshift Insoles**	**Informational Materials**
Usability	2	0	+ 2	+ 1
Affordability	3	0	+1	+3
Adaptability	1	0	+ 1	+ 1
Aesthetic	1	0	0	+ 1
Durability	2	0	-2	+2
Sustainability	1	0	-1	+1
Quick Accessibility	1	0	+1	0
Weighted Total		**0**	**2**	**9**

The education material that we are implementing will incorporate the fundamental benefits of both the makeshift grocery cart and insoles without the necessity costs of either solutions. The plan would encourage healthy lifestyle habits without fitting to any particular structure allowing it to be flexible and attainable by a greater audience. This idea was approved by Flying Sams which has access to the campus resources such as free printing to make this solution feasible.

4. Analysis & Testing

4.1 Overview

We tested our handout with people who are currently unaffected by the tribulations of worsening footcare. We went for people who are not necessarily concerned in the short term effects of our solution but are interested in the information out of curiosity and education. Our target demographic will be people who want to learn more about foot care and can understand materials at around a high school reading level. Based on the feedback, we will improve on our design by better delineating the medical attention section's header and by using color more effectively to increase our design's overall aesthetics.

Table 4.1 - Analysis & Testing Summary Table

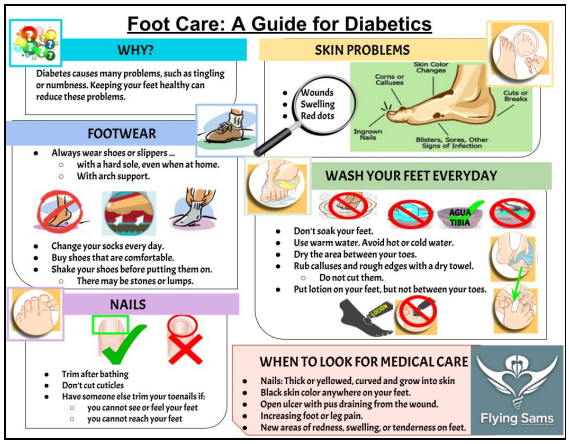
Criterion	Metric	Target Value	Resultant Value	Method
Affordability	Cost to produce each prototype	< $5	< $0.15	Calculation and Research
Aesthetic	Rating on a 5-Point Likert Scale	≥ 4	4.03	User testing and follow-up questions
Accessibility/ Readability	Time it takes to find each section	≤ 10s	5.58s	User testing and follow-up questions
Usability	Rating on a 5-Point Likert Scale	≥ 3	3.37, If knew someone with diabetes: 4.29	User testing and follow-up questions

4.2 Desirability & Usability

Introduction: The design requirements we are testing include the aesthetics, accessibility or readability, and usability of our informational handout. For aesthetics, we ask, "On a 5-point Likert scale with 5 being the most aesthetically pleasing, what score would our user give to our prototype?" For accessibility and readability, we ask, "How fast can the user identify the 6 different sections of information on our prototype?" And for usability, we ask, "On a 5-point Likert scale with 5 being the most usable, how likely will our user use or implement the advice on our handout?"

Methods: Our prototypes were informational handouts on foot care for diabetics. We divided our information into 6 sub-sections: the importance of foot care, skin problems, footwear, washing one's feet every day, nails, and when to look for medical attention. We made

one prototype in English and another in Spanish and tested both for our aforementioned design requirements.



Figures 4.1 (Left) and 4.2 (Right): Our English and Spanish flyers, respectively

Table 4.2 - User Tests; for detailed results: User Test Results Spreadsheet

Participant	Demographic Info	Location	Participant	Demographic Info	Location
Pudan Xu	Female Non-Spanish speaker N - does not know anyone with diabetes	By Muir Apartment	**John Lim**	Male Non-Spanish Speaker Y - Knows someone with diabetes	Apartment
Andria Guillen	Female Spanish speaker, can't read Spanish too well Y - knows someone with diabetes	By Muir Apartment	**Oscar Alvarez**	Male Spanish Speaker Y - Knows someone with diabetes	Apartment
Alejandro Hernandez	Male Proficient Spanish speaker and writer Y - Family on both sides has diabetes (Latino)	Revelle College - Keeling Apartment	**Susan Li**	Female Non-Spanish Speaker Y - Knows someone with diabetes	Apartment
Frank Garcia	Male Proficient Spanish speaker and writer	Revelle College - Keeling	**Lisa Liao**	Female Non-Spanish Speaker	Apartment

	N - No family with diabetes	Apartment		N - does not know anyone with diabetes	
Justin Skaggs	Male Spanish speaker N - Does not know anyone with diabetes	Peet's coffee	**Daniel Medrano**	Male Non-Spanish Speaker N - Does not know anyone with diabetes	Video Call
Brian Shoushi	Male Non-Spanish speaker N - Does not know anyone with diabetes	Price center	**Jorge Hernandez**	Male Spanish speaker Y - Knows someone with diabetes	Video Call
Grace Kim	Female Non-Spanish Speaking N - Does not know anyone with diabetes	Apartment	**Jonny Cook**	Male Non-Spanish Speaking Y - Knows someone with diabetes	Apartment
Jonathan Huang	Male Non-Spanish Speaking Y - Knows someone with diabetes	Revelle College - Keeling Apartment			

We standardized our testing procedures as follows:

After asking for a signed consent form, we record the demographic information of the participant, namely whether they speak Spanish, their gender, and whether someone they know has diabetes. To test the aesthetics of our prototype, we present one version of our prototype to the participant and ask them to rate how visually appealing it is on a 5-point Likert scale, with 5 being the indicator of highest visual aesthetic. To test the accessibility or readability of our prototype, we ask our users to point out 5 of the 6 sub-sections (Why, Washing, Footwear, Medical Attention, Nails, and Skin Problems) and time how quickly they take to point to each section. Then, to test how usable the information on our handout will be, we will ask our users to rate how likely they are to apply the advice or tell someone about it using a 5-point Likert scale, with 5 being the most likely. After these tests, we will ask the user follow-up questions to fill out a capture grid consisting of the following questions:

1. What was good?
2. What are some things to change?
3. What questions or concerns do you have?
4. What ideas can you suggest?

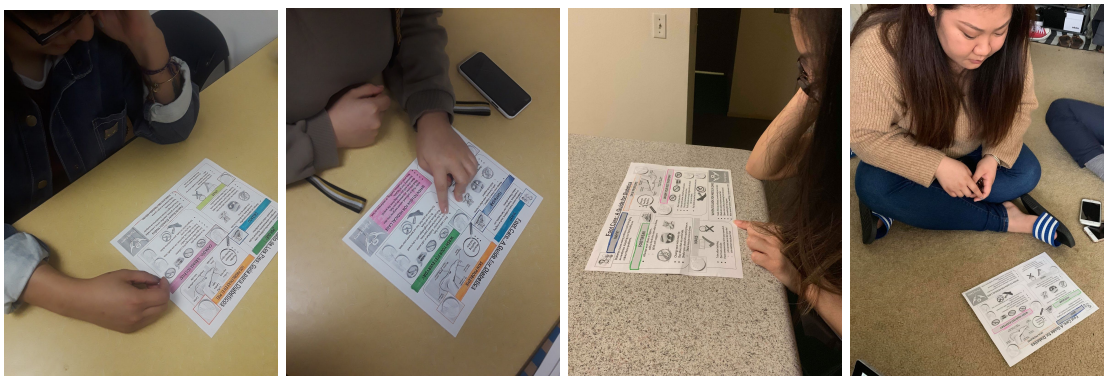
We averaged results across all participants:

** For more details, see User Test Results Spreadsheet.*

- Aesthetics Rating: 4.03/5
- Time averaged: 5.58 seconds per section
- Usability Rating: 3.37/5
    - Rating of users who knew someone with diabetes: 4.29/5

Table 4.3: Summary Capture Grid of User Tests

Good?	**Changes?**
• "Informative, quick, easy to remember." • "It gives me some new advice that I had no idea about before." * "Nice, bold headings" * "Layout is good"	• "Add colour." • "Can be more detailed." * Take out section pictures * "Make last section consistent" * Include explanations
Questions/Concerns?	**Ideas?**
• "A lot is going on." • "Why can't people soak their feet?" * "Is the translation going to be correct?"	• "Add 'feel free to ask doctor/website for more info." • "Do an informational presentation and lead a group discussion."



Figure(s) 4.3: Pictures of our user tests; printed prototypes may have affected testing results.

Discussion:

From our results thus far, we found that certain participants took twice as long looking for medical attention section than compared to their average time to locate all the sections. This may be because unlike the other sections, the header for the medical attention section is in the same space as and is not differentiated from its bullet points. This may have confused users who

were accustomed to the clearer outlines of the other 5 sections. Fixing this may facilitate the user experience of our design. According to the average usability ratings (3.37/5), especially from the users who say they know someone with diabetes (4.29/5), our solution does seem to fulfill a meaningful need; many of our test users expressed that they would use this advice or tell someone about the diabetic foot care tips. With the slight exception of the medical attention section header, our prototype is intuitive and easy to use, since all of our users were able to point out the different sections in under 10 seconds (5.58 seconds). This indicates that with the aid of colorful signifiers, our design is easily accessible. Some limitations to our procedure include how our printed prototypes were not as colorful as our online one (which may have affected the design's aesthetic score) and how our tested user demographic did not consist of older people, who may have a harder time reading the flyer.

4.3 Feasibility & Suitability

We designed a flyer for Flying Sams to distribute to their clients. The prototypes our group has designed utilize ink on paper from printers making these designs very feasible and cost-effective. Constructing each prototype costs $0.15 at most when using color to print and $0.08 when printed in black ink. Since our group received no money from Flying Sams to create any prototypes and is catering to a lower income community, our design requirements required a cheap product to be feasible which is exactly what we made, making this design extremely feasible.

Prototype**:**

Figure 4.2: The Spanish flyer that we prototyped

The only resources required to re-create our prototype are ink, paper, printer, and a computer and these are all things that the Flying Sams clinic has available. Delivery is handled by hand from staff to users and the only thing needed to use our prototype is the users' eyes.

Procedure**:**

In order for implementation, a distributor would need to load the prototype onto a computer and send it out for print via a printer. The flyer that gets printed out is then fully ready to be distributed and requires no assembly as all information is available in an instant.

Results**:**

We found, based on interview data, that our prototype does a great job at conveying our intended information. When we were testing, we also found that this design was highly feasible since it was easy for us to produce several copies. As for sustainability, we were able to take our prototype from tester to tester with high repeatability, demonstrating the high sustainability of our design since it had many more uses than one. We want our design to be highly repeatable, therefore, being easily transferable from person to person is a design success. Overall, we expect the design to work as intended and with several iterations to fix the minute details, we expect it to be successful.

4.4 Sustainability

Ecological Sustainability:

The primary resource that we are using for the educational handout will be printers and printing accessories. All of the supplies will be provided by Flying Sams UCSD division, which will deliver a consistent and sustainable volume of handouts. The solution will most likely create more paper waste in the community that the clinic is situated in, but as long as it goes to the intended waste facilities, the impacts are minimal. The remaining print outs that don't turn to waste will hopefully find their way to peoples' homes, on their counters or the front of their fridge.

Economic Sustainability:

Our prototype costs less than $0.20 to produce, making it extremely cost-effective to implement, use, and maintain since producing another copy is very cheap. We educate a family member who educates their family, who then educates their friends and people they know. We are promoting an education system that ripples through families and communities and thus they are improving their self-sufficiency. This information will also help their financial security by not having to go to the hospital as often with foot pain/issues, saving money from doctor/hospital visits.

Socio-Cultural Sustainability:

Our educational handout is culturally appropriate because our final product will be translated into Spanish for the clients of the Flying Sams clinic. Providing our information thoroughly and grammatically correct as possible to their native language will help educate the community. The community of Chapultepec is not as determinative on the smaller details of our design progress of the prototype because of our inability to have consistent communication. We work with the UCSD Flying Sams members to determine the relevant information we can communicate to our end-users. The way our users can improve is by the user is passing down the knowledge to other family members and those not aware of the Flying Sams in the community. We hope our solution promotes social justice by spreading the awareness and education of proper foot care to everyone in the community of Ensenada, Mexico.

5. Design

5.1 Overview

Our final solution is an educational handout given by the Flying Sams clinic to its clients in the community of Chapultepec. We aim to educate the community about proper foot care to address the grocery problem from a different angle. The large drawings and simple language help to convey information that is more approachable while remaining informative. The visual tools are found in specific locations for added understandability. All of the information can be accessed on a single page to standardize the overall form of the product.

Some typical use case scenarios of our design include the following:

- An aid for users to know what to consult doctors about or when to seek medical care
  - Users can refer to the flyer when asking for more information from their doctors.
- The basis of monthly educational programs
  - Doctors can use the flyer as a guideline for diabetic lifestyle education
- A flyer to keep at home and refer to for daily instructions on how to take care of feet
  - Users and their family members can know the foot care behaviors to avoid or adopt.
- An educational means to pass the time waiting at the clinic
  - Users can quickly browse through the handout while waiting for check-ups.

Figure 5.1 FINAL DESIGN (Spanish); for English, see Appendix B, Figure B.1

5.2 Detailed Design

All of the information can be accessed on a single page to standardize the overall form of the product. This allows for easy production of these flyers. To produce these flyers, the user would just need the digital copy and a printer to print it out. Each section is distinguished be large bolded headers, making them easy to locate. All the information for a specific section are encapsulated in their own boxes to not lead the user into any confusion between the sections of information. There are simple, easy to follow drawings to provide the user with visuals to reference and deepening their understanding of the content.

Guidelines for Implementation (Included as Part of Final Design):

Alongside our final prototype, we have included a how-to guide for our partner organization, in order to help them to implement our design. The guide addresses the suggested assembly, usage, and maintenance of our design at the Flying Sams clinics in Ensenada (see Figure 5.2).

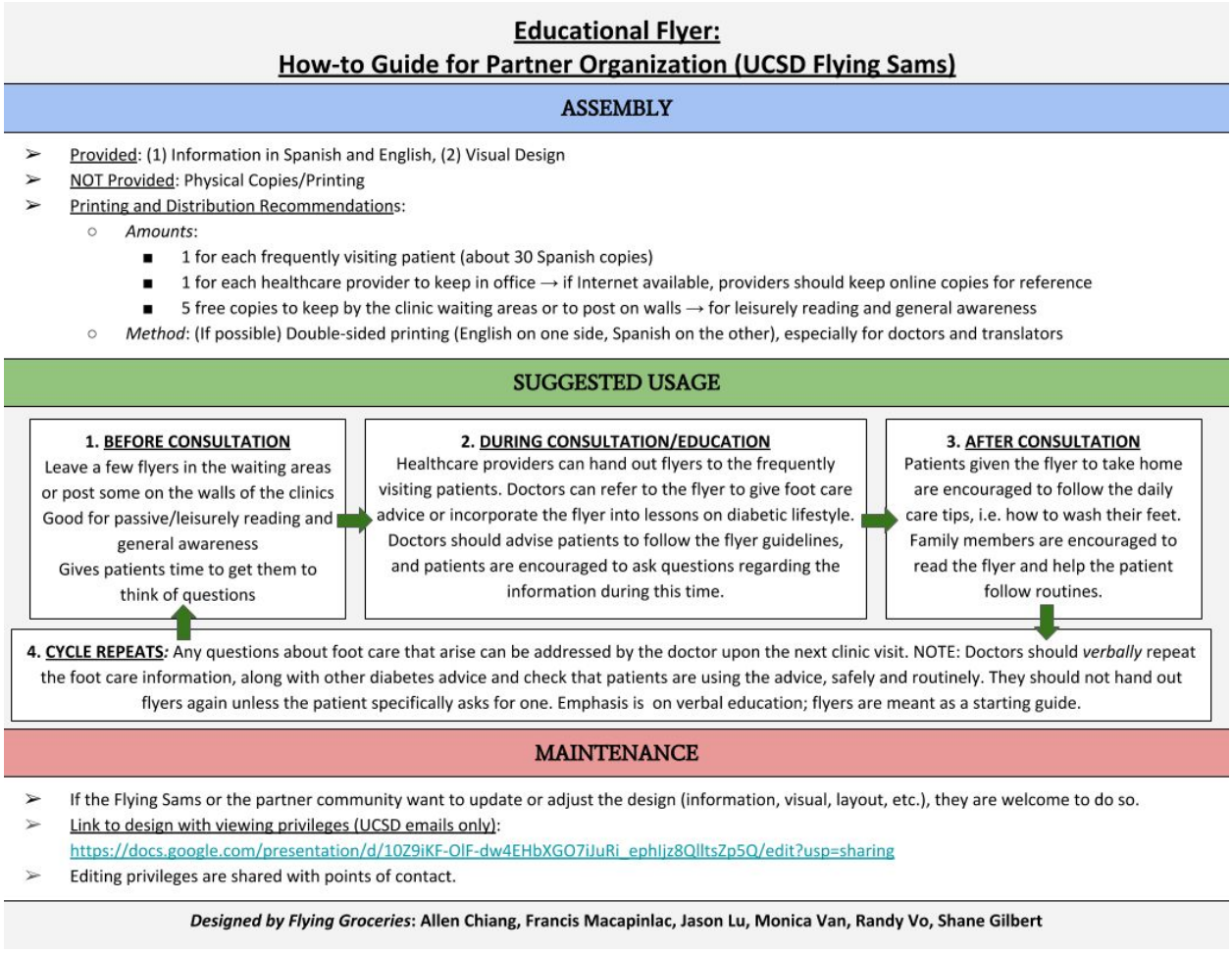


Figure 5.2: Instructional materials to help Flying Sams implement our education flyers.

6. Implementation & Impact

6.1 Implementation

Our plan to have our solution implemented begins with reaching out to the healthcare professionals who volunteer for UCSD Flying Samaritans in order to verify that the healthcare information we intend to present within our pamphlet is both correct and could not potentially result in harming the end users if they were to properly follow the instructions presented. After this, we would make any changes necessary to ensure our solution does not cause any harm before sending the digital files of our pamphlet to UCSD Flying Samaritans. Finally, UCSD Flying Samaritans will be responsible for the production and distribution of our healthcare pamphlet design and would collect patient feedback to determine the efficacy of this solution. We anticipate these final steps to take no more than one month as there is currently a minimum viable product available for the end user.

A strategy we could use to engage stakeholders include appealing to their pre-existing desire to educate the Ensenada community about how to maintain their health and deal with diabetes. Because out design aligns with our partner organization's overall goals and aspirations, they are ideologically incentivized to implement our design, which is an expansion of diabetic healthcare education with an emphasis on foot care. Furthermore, our design is easily integrable into the current clinic practices, as doctors already give patients lifestyle advice regarding diabetes. Some disincentives to our users to implement our solution include the seeming triviality of foot care; unlike dietary restrictions, users might think foot care might not be as important to their diabetes and therefore might choose to ignore the advice. We can mitigate this disincentive by explaining to our users and stakeholders the importance of diabetic foot care on our flyer. Much of the information on our flyer requires little maintenance, but should our stakeholders want to update the design or adapt the information to a flyer, the information is publicly available. In terms of our flyer, we would just give ownership to Flying Sams, and they can update the design as they wish.

Table 6.1: Resource Assessment
*Partner org. includes volunteer participants in the organization

Distribution	Activities	Capabilities	Responsibilities		Still Needed?
			Design Team	*Partner Org.	
UCSD Flying Sams will be responsible for printing and distributing the foot care pamphlet design that we have sent to them. Our end users would ideally receive them during their consultation with volunteer doctors that work at the UCSD Flying Sams medical clinics in Chapultepec, Mexico.	Outreach	Foot care research	**X**		
		Pamphlet design	**X**		
		Informing volunteers about material on foot care pamphlet		**X**	
	Clinical Services	Patient consultations		**X**	Orthopedic foot care in the event someone needs medical treatment for feet issues.
	Performance Tracking	Patient feedback collection		**X**	
		Pamphlet efficacy discussions	**X**	**X**	
	Informational Material	Production		**X**	
		Distribution		**X**	

6.2 Failure Analysis

We conducted a Failure Mode and Effects Analysis (FMEA) (Table 6.2). The potential failures of our product include: users ignoring, not understanding, or misunderstanding or misusing the advice outlined on the flyers, and the healthcare providers refusing to use the flyer. While we may end up wasting paper and ink if the users choose to ignore our flyer, we only plan to print enough flyers for the amount of clinic frequenters, so we would only waste so much. We

would mainly want to rely on the healthcare provider to orally transmit the information to clarify and reinforce the flyer information. For a more severe failure, some users might misinterpret our information and end up getting hurt, but since the chances of this happening are low and since their injuries would be easy to detect, the overall risk of this failure is mitigated.

Our biggest concern, however, is the healthcare provider's rejection of our flyer. If the doctors refuse to teach about healthcare, then the patients would remain oblivious to the importance of diabetic foot care, the entire premise of our design challenge. While the chances of this happening are low, since the healthcare providers have the interests of the patients in mind and since our design aligns with their current diabetic education practices, detecting this problem would be more difficult since we cannot readily communicate with the providers. Nevertheless, we can encourage Flying Sams to suggest foot care education to the doctor. Even if the doctors end up not using our flyer and teaching the patients differently, patients can still learn more about how to take care of their health.

Table 6.2: Failure Mode and Effects Analysis (FMEA)

Failure Mode	Effect(s)	Severity (1-10)	Occurrence (1-10)	Detection (1-10)	Risk Score (S*O*D)	Action
Users ignore the information on the flyer	Flying Sams wastes around paper and ink	2	5	5	50	Limit the amount of flyers printed (i.e. 30); Have the healthcare provider reiterate the information orally or during consultations
Users don't understand the information on the flyer	Patients are confused or do not follow the flyer guidelines	2	4	4	36	Have the healthcare provider explain the information and answer patient questions
Users misusing information on the flyer	Patients implement the wrong advice and get hurt	9	2	2	36	Nothing, but patient will likely seek out healthcare provider to treat injury; provider will have to explain how to correctly use information

Healthcare providers reject the information	Patients remain unaware about the importance of diabetic foot care	8	2	5	80	Nothing, just encourage Flying Sams to prompt doctors to teach about foot care, not necessarily using the flyer

6.3 Monitoring & Evaluation Plan

The Flying Sams clinic is filled with many people who suffer from diabetes and the foot problems associated with the problematic disease. The clinic is also filled with several elderly members who suffer from lower body pains. Our hope is to reach all of these patients such that foot pains no longer become a major problem in their lives. We hope that our users will take the knowledge from our fliers and apply them to their everyday lives, improving the way they think about their feet and the ways they can improve them. When they feel like they have a good grasp on how to improve their feet, our goal is for them to disperse that information and knowledge to their families and communities such that as many people as possible are able to learn and improve their lives.

The Monitoring and Evaluation Table displays the data that will be tracked to assess the effectiveness of our solution in achieving our main goal of reducing the strain that the patients deal with in their day to day lives. The input is how many flyers are available to the doctors and patients at the clinic. The output is how many patients are taking these flyers home and using them. The number patients that report a reduction in foot pain will indicate how well our solution is working for the patients.

Table 6.3: Monitoring and Evaluation Table

	Objectives	**Indicators**	**Baseline**	**Target**	**Means of Verification**
Inputs	Informational flyer on foot care	Number flyers at the Flying Sams' clinic	0	30	Clinic statistics given to us by a staff member (Flying Sams)
Outputs	Patients have easier access to information on proper foot care	Number of patients taking the handouts home	0	10	Clinic statistics given to us by a staff member (Flying Sams)
Outcomes	Reduction in patient foot pains	Number of patients who report reduced foot pain	0	2	Clinic statistics given to us by a staff member (Flying Sams)

Impacts	Increase in patients' health and satisfaction level	Patients report that their foot pains improve and they feel better	0	2	Clinic statistics given to us by a staff member (Flying Sams)

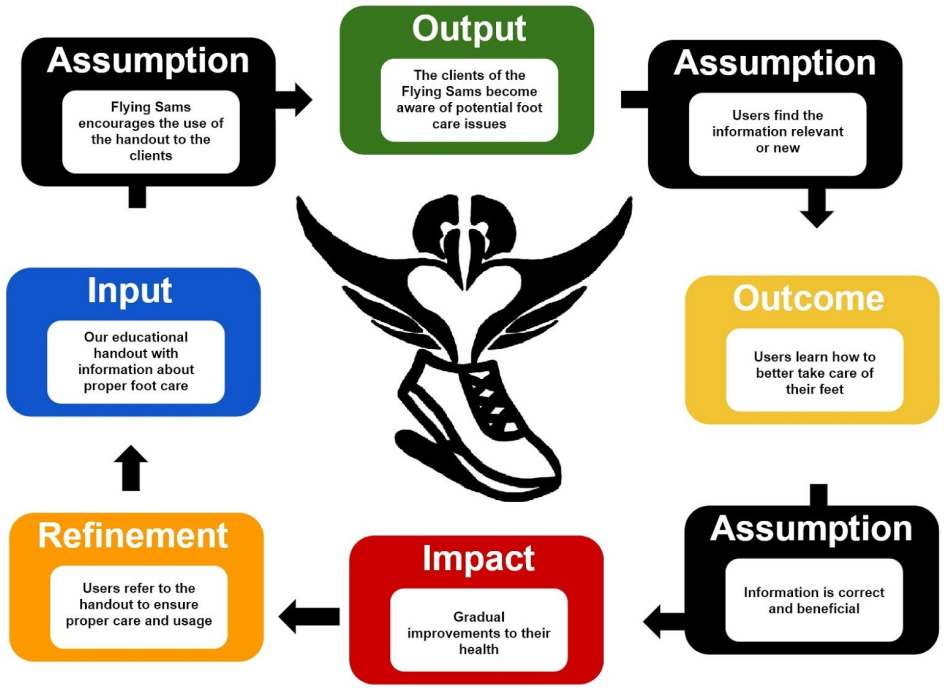


Figure 6.4: Theory of Change Diagram

6.4 Ethical Analysis

The main goal of our solution is to benefit the patients of the Flying Sams' clinic, their families, and the health professionals at the Flying Sams' clinic. It aims to educate patients on how to take better care of their feet. If the patients are able to effectively use the information presented in our handout, they can potentially reduce the strain they feel during their walks to and from the grocery stores. The patients will be able to bring the fliers (our solution) to their homes for their families to also learn from. Our solution also allows provides the health professionals an easier way to teach their patients about foot care. However, no solution is without its potential problems. Some of our potential problems include doctors who may find our work to be an additional hassle that they would have to include in their instructions. The clinic may also find issue in allocating resources to allow printing of our fliers since our solution requires some amount of time and a small cost that is associated with printing the fliers out. If our fliers go unused, they will also pose a minor ecological issue. Paper, when misplaced or thrown out, can litter the environment, negatively impacting the ecology of the community we sought out to aid. If our solution gets printed out and remains unused, they will also be a waste of paper and ink, negatively affecting the economy of the clinic.

7. Conclusions & Recommendations

Our team, Flying Groceries, was given the initial challenge of designing an easier way to carry groceries for our partner organization, the UCSD Flying Samaritans, which operates a clinic in Chapultepec, Ensenada. To discover the underlying problems and to empathize with our given community, we conducted background research on Ensenada and conducted personal interviews with our partner organization. From our research, we found that groceries was not at the heart of our community's problems. Rather, travel and healthcare were. With this information, we defined the underlying needs of our Ensenada patients and came up with a problem statement to reframe our design challenge.

Our revised problem statement is the following: The patients of the UCSD Flying Sams clinic in Chapultepec, Ensenada **NEED** healthier means of travel **BECAUSE** they lack access to affordable transportation due to their socio-economic status and face difficulties commuting long distances on foot due to chronic health conditions. Given this new perspective on our problem, we set out to develop potential solutions that would address these needs. From our ideation sessions, we came up with different concepts that we ideally wanted to incorporate in an integrated solution that still revolved around groceries: a sustainable grocery cart, diabetic footwear, and foot care education. However, after conducting our user tests and deliberating on our given resources and constraints, our team ultimately decided to abandon our attachment our initial groceries challenge altogether and reign in on our solution so that we could feasibly deliver it by the end of the class.

Collectively, we decided that foot care education would be the most beneficial and would align best with both our partner organization's values and our community's underlying health problems. By increasing overall awareness of the importance of foot care for the diabetic patients who make up the majority of the clinic's base, our team would provide the first step required for the community to improve the health of their main means of travel: their feet. Having converged on the concept of foot care education, our team eventually, after different prototypes, honed in on our final prototype: an education flyer. We discussed our final solution with our partner organization and they green-lit our idea. From there, we created two versions of this prototype, one in English and one in Spanish in order to facilitate understanding for all of our main stakeholders: Flying Sams, the healthcare providers at the clinics, the patients of the clinic, and the ENG 100D classroom administrators. We again received feedback from Flying Sams before finalizing our prototype and final solution.

In order to deliver our solution, we will provide the Flying Sams with our designed flyer and instruct them on how we intend to implement our solution, which we hope to happen soon following the writing of this report. In the meantime, to reflect on the ways our solution could evolve, we recommend that future designers continue to strive towards our aforementioned integrated solution. For more short-term future changes, we could look into ways to reword the information on our educational flyer to include catchy slogans or phrases in Spanish and English so that readers of the flyers can more easily remember the information and thus, be more inclined to share what they have learned about foot care to others. This would increase the overall awareness of not just our target users but also the health of the larger Ensenada community.

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Appendix A

Flying Groceries: Team Meetings

1. Team Contract and Initial Team Bonding

- Time and Place: 1/25/19 (Week 3, Friday), 2-3:30 pm, Geisel Library
- Attendance:
    - Present at 2 (4/6): Allen, Randy, Monica, Shane
    - Present at 2:30 (6/6): Allen, Randy, Monica, Shane, Jason, Francis
    - Left at 2:50: Monica, before photo for team bonding event was taken
    - 7th member, Rosa, dropped the course
- Summary: We completed the team contract and as we did so, we chatted about our schedules and backgrounds, which served as our initial team bonding event. We also completed a draft of initial survey questions we intended to ask our end-users.

2. Second Team Bonding (Spyfall)

- Time and Place: 1/29/19 (Week 4, Tuesday), 6:30-7:30pm, Commuter Lounge, PC
- Attendance:
    - Present (6/6): Jason, Randy, Shane, Francis, Allen, Monica
- Summary: We discussed potential stakeholders we could interview that could give us more insight into our actual end-users in Ensenada for the first few minutes. For the rest of the time, we played Spyfall from our phones. We took turns asking each other questions in order to figure out who the spy in the room was.

3. Project Management Draft

- Time and Place: 2/1/19 (Week 4, Friday), 2-4:30pm, Geisel Library
- Attendance:
    - Present at 2 (4/6): Allen, Randy, Monica, Shane,
    - Present at 2:30 (6/6): Allen, Randy, Monica, Shane, Jason, Francis
    - Left at 2:50: Monica (returned at 4pm)
- Summary: We started a Gantt chart, reviewed each other's interview questions and decided on main framework for interviews for each type of stakeholder, and drafted the project management portion of our report.

4. Problem Definition

- Time and Place: 2/8/19 (Week 5, Friday), 1-4 pm, Geisel Library
- Attendance:
    - Present at 1 (3/6): Randy, Monica, Jason
    - Present at 2:45 (5/6): Randy, Monica, Jason, Allen,
        - Absent: Shane

- Left at 2:50: Monica
- Summary: We drafted out the problem statement section of our report. We downloaded our learnings into the background and research section of the problem statement, created empathy maps, and narrowed down our design requirements.

5. Work in Progress Presentation Slides

- Time and Place: 2/15/19 (Week 6, Friday), 1-4pm, Geisel Library
- Attendance:
  - Present at 1 (3/6): Randy, Jason, Monica
  - Present at 1:45 (5/6): Randy, Jason, Monica, Allen, Shane
  - Present at 2:45 (6/6): Randy, Jason, Monica, Allen, Shane, Francis
  - Left at 2:50: Monica
- Summary: We created our midterm progress slides, updated our Gantt Chart, updated our user profiles, and redefined out problem statement.

6. Work in Progress Presentation Slides Revision and Practice

- Time and Place: 2/18/19 (Week 7, Monday), 1-3:30pm, Geisel Library
- Attendance:
  - Present at 1 (4/6): Jason, Monica, Francis, Randy
- Summary: We updated our work in progress slides and assigned slides to each person. We created an outline or script to record our presentation notes. We made sure that each member presents, and that we contain our part to a maximum of 1 and a half minutes. We also turned in our slides.

7. Concepts Draft

- Time and Place: 2/22/19 (Week 7, Friday), 1-3:30pm, Geisel Library
- Attendance:
  - Present at 1 (3/6): Jason, Randy, Monica
  - Present at 2 (4/6): Jason, Randy, Monica, Shane
  - Present at 2:45 (5/6): Jason, Randy, Monica, Shane
    - Left at 2:50: Monica
- Summary: We made an executive decision to focus on only one aspect of our proposed integrated solution (education, footwear, cart): education. We came to this decision after realizing that we were focusing on too many solutions and given the time constraints of the class and the financial constraints of our design challenge, education would be most feasible, usable, and accessible to the patients of Flying Sams.

8. Analysis and Testing Draft

- Time and Place: 3/1/19 (Week 8, Friday), 1-3:30pm, Geisel Library
- Attendance:
  - Present at 1 (3/6): Randy, Monica, Jason
  - Present at 2 (4/6): Randy, Monica, Allen, Shane
    - Absent: Francis
- Summary: We pooled all of our individual prototypes and created standard prototypes for our team to test with, one in English, one in Spanish. We also drafted the analysis

and testing section of our report.

9. Design Draft

- Time and Place: 3/5/19 (Week 9, Tuesday), 5-6:30pm in class
- Attendance:
    - Present at 5 (5/6): Francis, Jason, Monica, Allen, Randy
        - Absent: Shane
- Summary: We collected all of our user testing data into a spreadsheet and drafted the design portion of our report. We also revised our solution based on our user feedback.

10. Implementation and Impact Draft

- Time and Place: 3/12/19 (Week 10, Tuesday), 5-6:30pm in class
- Attendance:
    - Present at 5 (6/6): Francis, Jason, Monica, Allen, Randy, Shane
- Summary: We drafted the implementation and impact portion of our report.

11. Conclusions and Recommendations Draft

- Time and Place: 3/14/19 (Week 10, Thursday), 5-6:30pm, in class
- Attendance:
    - Present at 5 (5/6): Francis, Jason, Monica, Allen, Shane
        - Absent: Randy
- Summary: We drafted the conclusions and recommendations portion of our report. We also edited our other drafts to use as the final draft. We also planned our final presentation and worked on the slides. We also updated our Gantt Chart.

12. Final Presentation Practice

- Time and Place: 3/21/19 (Finals Week, Thursday), 4-6:30 pm, Geisel
- Attendance:
    - Present at 4 (6/6): Francis, Jason, Monica, Allen, Shane, Randy
- Summary: We practiced for the final presentation.

Participant	Gender (M/F)	Spanish/nonSpanish	Knows someone with diabetes? (Y/N)	Aesthetic (#/5)	Readability (sps)	Usability (#/5)	Good?	Changes?	Qs/Concerns?	Ideas?	Additional Comments
Daniel Medrano	M	Non-Spanish	N	3	10	2					Maybe all the sections shouldn't be bolder/thick text (not including title of sections). It would grab eyes to smaller parts easier. Also I believe the pictures might make the image cluttered if they are on both section border top and in like the wash feet but idk about that part
Andria Guillen	F	Spanish - not proficient reader	Y	3.5 - prototype coloring not reflective of online version	3.17	4	informative, quick, easy to remember				
Jorge Hernandez	M	Spanish	Y	4	5	2		make last section consistent			It should be los problemas de la piel, not los problemas en el piel
Pudan Xu	F	Non-Spanish	N	3.5 - prototype coloring not reflective of online version	1.58	3			Why can't I soak my feet?		
Lisa Liao	F	Non-Spanish	N	4	n/a	2 This doesn't feel relevant to me because you don't know anyone with diabetes	Lots of information, consistent and nice visuals. Nice bold headings.	Font doesn't look consistent. Condense and go for main points.	Is translation going to be correct?	Use real pictures of feet and the symptoms.	"Yeah, it's like… good facts, but I don't think people would actually implement it" "It should be made into a brochure" "Should be a numeric, step-by-step system"
Susan Li	F	Non-Spanish	Y Knows someone with type-2 Diabetes.	3.5 Section pictures seem kind of random. "Sections should feel more procedural or step-by-step"	n/a	5 I would because I know someone with diabetes.	Pictures are very presentable. They give good demonstrations.	Unnecessary graphics (section headings). Too "extra" and people don't know what to look at.	"When to look for medical care" should also mention about regular checkup and routine.	Could also talk briefly about checking for diabetes. A non-invasive way is to look at someone's eye.	
Justin Skaggs	M	Spanish	N	5	10s	2					
Brian Shoushi	M	Non-Spanish	N	4	8s	1					
Frank Garcia	M	Spanish	N	4	5s	3	Pictures and layout are good	Grammatical errors			
Alejandro Hernandez	M	Spanish	Y	5	11s	5	Layout is good	Grammatical errors			Mentioned how his family memebers with diabetes are aware of their health condition but are not as knowledgable as they should be. This educational handout could help
Jonathan Huang	M	Non-Spanish	Y	4.5	n/a	5	Organization and visuals are good.			Could add more to the "why" section to talk about diabetes more	Answered all my reading comprehension questions correctly (English version)
Grace Kim	F	Non-Spanish	N	3.5	3.8	3.5	Liked the graphics that we used	We could work on organization			
Jonny Cook	M	Non-Spanish	Y	4	4.38	4	Found it intimidating at first, but liked the design afterwards	Simplify the design			
John Lim	M	Non-Spanish	N	5	4	4					
Oscar Alvarez	M	Spanish	Y	4	4	5					
			avg:	4.03	5.58	3.37					
						if knew someone with diabetes: 4.29					

Figure A.1: User Tests

Appendix B

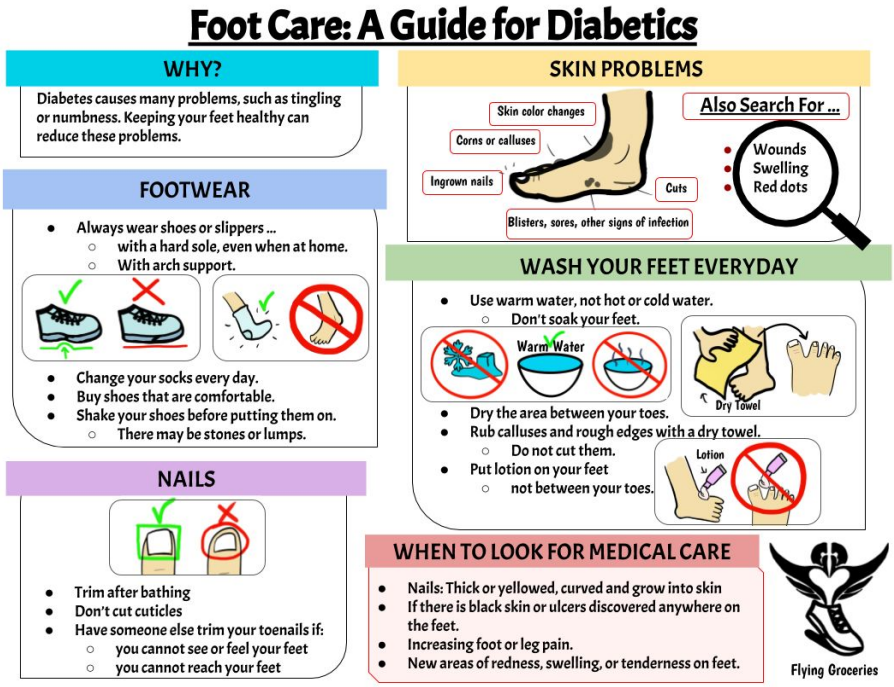

Figure B.1: FINAL DESIGN (English)

Figure B.2: FINAL DESIGN (Spanish)

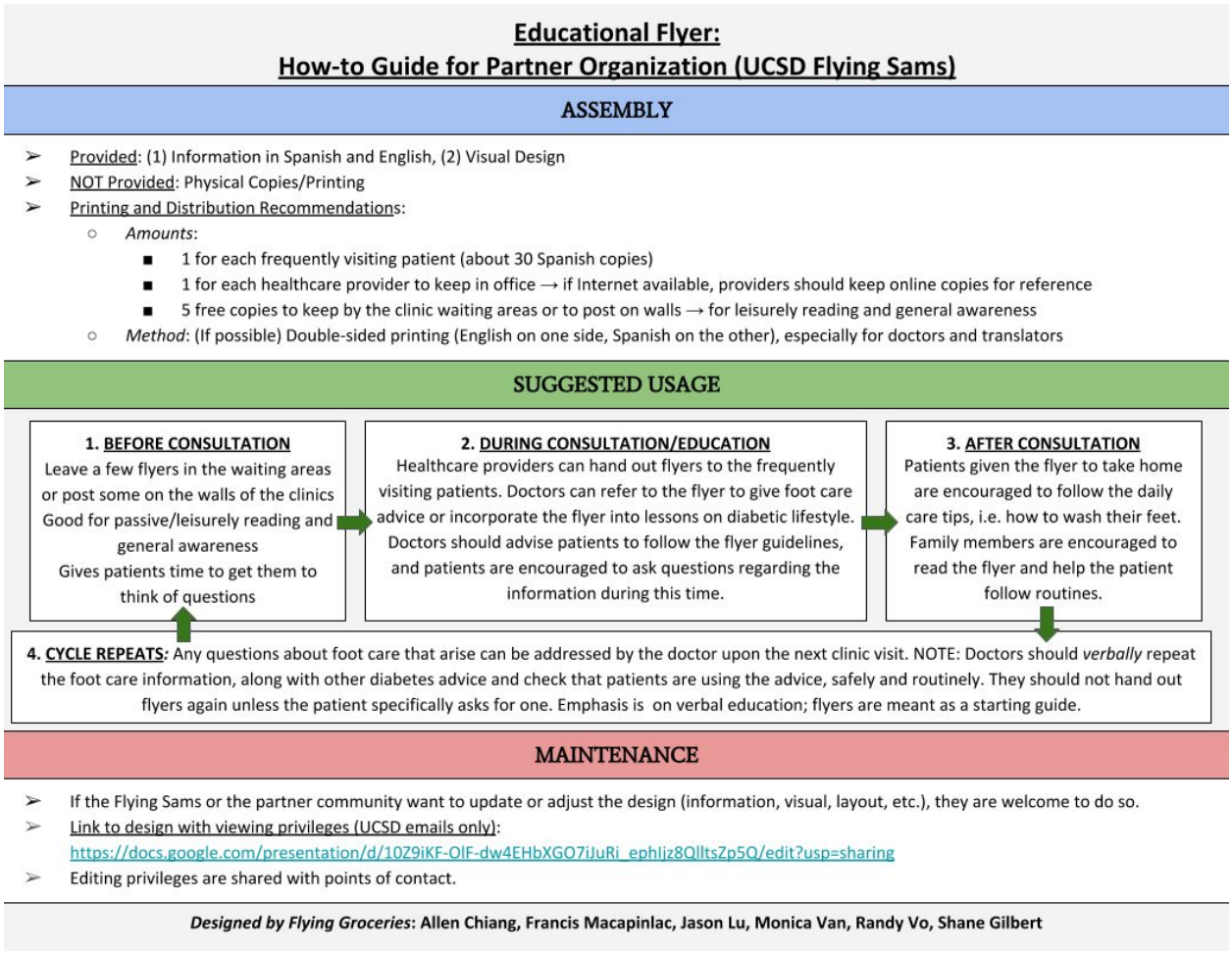

Figure B.3: How-to Guide for Flying Sams