Watts Up House

Design Report

EUNIME

Rosalva Martha-Patten, CEO

"Es Por Los Ninos"

ENG 100D

Brandon Reynante

Fall 2016

Global Ties

UCSD

Watts Up Team

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December 5th 2016

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Executive Summary

The objective of our project was to provide Up House with a cheap and sustainable way of heating and cooling the house. We wanted to help them save electricity so that they put their focus on helping their clients and worry less about electricity costs. Our client is Eunime, an organization that helps low-income families in Tijuana, and more specifically the founder of Up House, Rosalva. Rosalva was the one that contacted us about the project. She is the founder of Up House, which is an organization that works with families in Tijuana that are diagnosed with HIV/AIDS. She has had a personal experience that has driven her to combat the lack of support for people with AIDS in Tijuana — her son being diagnosed with HIV. While she is our client, our end users also include the staff of Up House and the families that go there seeking aid and information. The staff is composed of volunteers that are passionate about helping their communities and the disenfranchised people of Tijuana who are diagnosed with HIV/AIDS. The families are often including either parents who have AIDS, children who have contracted AIDS or both. The parents come to Up House seeking knowledge and support. At the house the families learn how to keep themselves from spreading the disease and how to talk to their children who have been diagnosed once they come of age. It is not uncommon for the children that come to the house to be unaware that they have the disease.

Up House is a repurposed donated house that functions as a community center where families can go when seeking a place to eat, learn and play. The house is currently not finished and is vulnerable to drastic changes in temperature and weather since it has no insulation. We are working to try and mitigate the intense heat and intense cold inside the house to make it more comfortable for the staff that work there and the families that go to Up House. When coming up with our solution we focused on sustainability, simplicity and affordability. We found it to be very difficult to address both heating and cooling with one solution so we focused on cooling. Our final design is called Succulent Wall, it is a hanging frame filled with succulents (plants similar to cacti). It makes rooms more comfortable by means of its natural water retaining process. It cools the rooms by increasing the humidity in the room and thus making the room feel cooler during hot periods. With this design we hope to bring a sense of comfort to the people at Up House while also helping lower their energy intake so money can be better spent elsewhere.

1. Project Management

1.1 Goals & Objectives

The goal of this project was to develop a sustainable, efficient source of energy to curb some of the costs faced by Up House. Up House is a house supported by the EUNIME organization in Tijuana, Mexico. The house serves as a welcoming community to those affected directly or indirectly by HIV/AIDS. The current energy state of the house was assessed by looking at the watts used by each product in the house. From there we calculated the total wattage and looked at the monthly electricity bill. This allowed us to determine the current energy intake of the house and see where it could be cut. The second floor of the house is not in use but will be used in the future and was therefore taken into account as well. This was be done by asking our client, Rosalva, what she plans to do with the space and estimating the costs that will occur once it is in use. The success of this project is defined by the amount of energy in watts that are saved. At the end of the 10-week period, we hoped to prototype a sustainable energy solution that could be implemented in the house and helps reduce electricity costs.

1.2 Approach

In order to successfully meet our goals, we found both primary and secondary resources such as research journals, books, and expert and client interviews to determine the right approach to finding energy saving solutions for Up House. With these resources our team had a brainstorming session where we created multiple possible design solutions. We then narrowed down our design solutions to three and eventually picked one. Throughout the entire process we sought our client's, Rosalva's, input in every design recommendation that our team came up with during our weekly Face Time calls. We made sure that Rosalva was always up-to-date with our progress and that she had a voice in every step we took. At the end of the project, we provided our client with a working prototype of our solution. If given the time, we would have liked to teach and assist Rosalva, the volunteers, and children in the creation of the final product.

1.3 Schedule

To stay on track for our short time period of 10 weeks, we created several stages for our project. These stages are listed below. Each stage spanned multiple weeks of our project. Every week we delegated tasks on Mondays and assigned tasks to be completed the Friday before each deadline. These internal deadlines were put in place to assure we had time to edit our assignments and review our progress before turning them in. Within each of the stages we also completed multiple assignments as well as individual tasks. These tasks/assignments are outlined in the Gantt Chart, Figure 1.1, shown below the 'Stages' section.

Stages

Overview

Our team addressed our design challenge through interviews, observations, on-site assessment, research, and prototyping.

Stage 1 — Outside Research and Interviews

The first stage of our design challenge included determining the stakeholders involved in our project. We then interviewed them and started to do outside research on energy saving so that we had some

knowledge before visiting the house. Interviews and on-site assessments were with Eunime community members and other stakeholders, some of the interviews can be seen under section 3 of the Appendix.

Stage 2 — Onsite Assessment
During our on-site assessment we took photographs and video footage of the house as well as wrote down observations of the daily processes occurring in it.

Stage 3 — Analysis
The third stage involved research. Our team explored many options and analyzed our research to come up with the best solution based on several criteria shown in Section 2.4 Design Specifications.

Stage 4 — Implementation
The fourth stage was to purchase, build and implement our design into Up House.

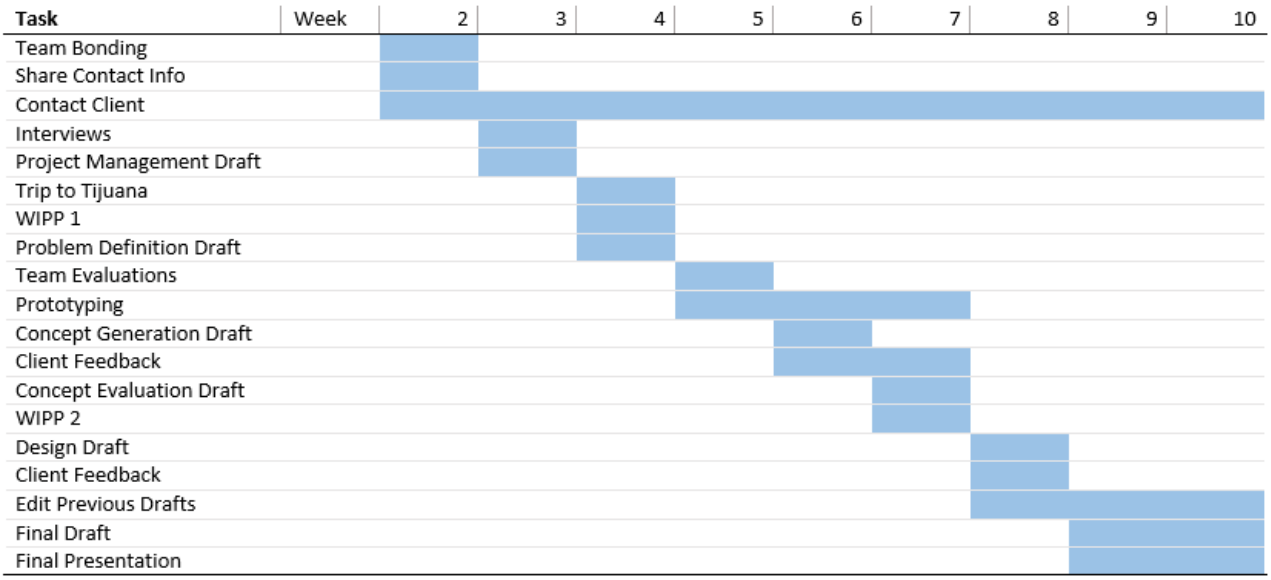
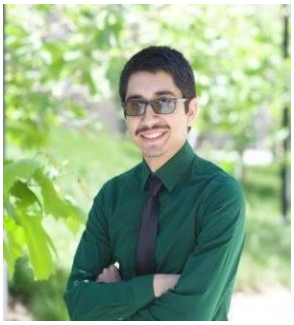


Figure 1.1 Gant Chart: A layout of our deadlines and progress throughout the project

1.4 Human Resources

Team Leader/ Translator



Cesar Magana

Cesar is a fifth year Electrical Engineering major. Combining his previous project managerial experience with his knowledge of the implementation behind renewable energy, Cesar makes for a strong team leader.

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Client Liaison

Erica Hong

Erica is a fourth year Urban Studies and Planning student. She brings her experience working as a Project Assistant and client oriented attitude cultivated through Sales to communicate with the client on behalf of the team.

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Editor

Sophia Krause-Levy

Sophia is fourth year Cognitive Science major. With her previous experience as editor, high academic marks, and her ability to stay focused and on task, she makes a great editor for the team.

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Secretary

Sydney Riegert

Sydney is a fourth-year Chemical Engineering student. She has an understanding and building experience with solar panels, wind turbines, and other environmentally friendly energy options. She is also experienced in project management, and will bring these skills to the Tijuana House team.

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Lead Researcher

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Kanan is a fourth year Structural Engineering major. He is qualified as a Lead Researcher because he is organized and able to report his findings weekly.

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Lead Researcher

Arindam Chatterji

Arindam is a fourth year Electrical Engineering major. As project lead for UCSD's first Solar Car he has experience with various kinds of renewable energy research as well as development.

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Presenter

Chichi Esmabe

Chichi is third year Environmental Engineering major. She has years of presentation experience under her belt. Her previous projects include videogames and solder reflow oven in which she was effectively able to deliver the design, process, and product to respective audiences for both projects.

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1.5 Stakeholder Analysis

Below in Figure 1.2 is the Stakeholder Analysis Matrix which shows which stakeholders have the most power and interest in our project.

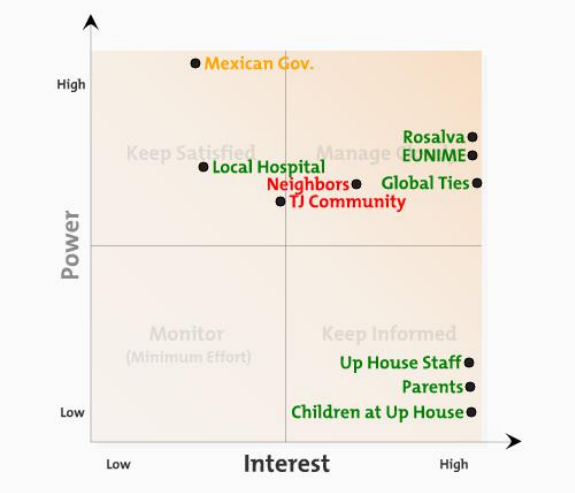

Figure 1.2 Stakeholder Analysis Matrix: This matrix shows the stakeholders in our project. They are categorized by color. Ally (green), opponent (red), indifferent (yellow)

Description of Stakeholders
Below is a description of the history and culture of each stakeholder along with their relationship to the other stakeholders and their perception of our project.

1. Children at Up House
They are impoverished and rejected by mainstream society. They may be too young to understand the goals of our project but it lead to a positive outcome for them because less money spent on electricity leads to more money for baby formula, clothes, etc.

2. Parents at Up House
They are impoverished and have few resources. They want to get help for their children and prevent them from contracting HIV/AIDS. They saw our project as something that will help them.

3. Staff of Up House
The staff that works at Up House are there because they have a connection to the cause that Up House fights for. They were in favor of our project because it benefited the nonprofit and lead to more money for resources outside of electricity. We kept them informed of our plans through Rosalva.

4. Eunime
Rosalva, our client, founded Eunime. It is named after the first two children that were helped by the house. Eunime was in favor of us doing our project as they are directly benefitting from the project and asked us to participate. We kept them informed by giving Rosalva weekly updates.

5. Global Ties
They brought the project to us and benefited from us making progress on the project. They wanted us to do well so that this project can lead to future opportunities and help people around the world. He

6. Rosalva (Founder)
She founded Eunime after her son was diagnosed with HIV in the 80's. She had never worked with Global Ties, but she welcomed our help and didn't know what to expect. We kept her informed through weekly meetings.

7. Local Hospital
They had an agreement with Eunime and still do. They recommended Up House to their patients diagnosed with HIV/AIDS. This project helped them because our project worked to keep Up House operational. We did not keep them informed but it benefited their patients and therefore the hospital.

8. Community Members
People with HIV/AIDs are looked down on by some of community due to lack of knowledge about the disease. Others do not have a view on the subject and simply want to be left out of it.

9. Neighbors
The neighbors could have been affected by the construction brought on by the project. Neighbors adjacent to the property might not appreciate the noise brought on by the construction, thus they might have had a negative impression of our project. We planned on managing them by putting up signs and informing them ahead of time when construction is being planned.

10. Mexican Gov.
To our knowledge since the early 2000's the local and national government worked along with NGO's to cease the spreading of AIDS. We believed that the government would favor our involvement in the Up House project, as it would help them stop the transmission of HIV/AIDS.

2. Problem Definition

2.1 Problem Statement

The EUNIME supported house, Up House, needed an affordable temperature-regulation system because it is important for the volunteers, families, and children to have a comfortable place to stay while getting support at the house. It is essential to keep the house temperature at a comfortable range because many families and children stay at Up House for multiple hours. In order for them to get the best quality of the services provided, it is also key to keep the temperature-regulation system at a low cost so that more money can go towards food, baby formula, social programs and other services for the children and families.

2.2 PESTLE Analysis

To help our team understand our potential allies and opponents during our time on this project we used a PESTLE Analysis. This required looking at all of the factors surrounding Up House and its goals, such as cultural standpoints, the government's position on HIV/AIDS, and sources of money/donations to curb the costs of the project. These factors are listed below with brief summaries describing what we learned through interviews and outside research.

Political: Nonprofits such as Up House help raise awareness of what HIV/AIDS truly entails and how it can be spread. In Tijuana, and Mexico in general, there is a stigma about HIV/AIDS, those infected are often disowned or neglected by others. We learned more about these stigmas while in Tijuana and found out that some of the kids we met at Up House were almost expelled because authority figures at their schools were afraid and misinformed about the disease. This is a large and common issue in Mexico. The local government of Tijuana is in contact with many non-profits trying to help groups in need but because there are so many important issues, it is hard for nonprofits to receive the money they need. In an interview with Rosalva, the founder of Up House, she explained that many Mexicans that do not live in Tijuana believe TJ receives a large amount of aid from the U.S. and because of this the federal government does not give much support to nonprofits in Tijuana.

Economic: The families that come to the clinic at Up House are in dire need of help with the average household income being around $20,000 USD a year [9]. The parents do not have the income to support their families especially with the additional costs of expensive baby formula so their children do not become infected. They do not have the money to pay for a psychologist or any sort of support to get their families through rough patches and the impending moment when they will need to tell their child that he or she is has the disease. The direct help for Up House is provided solely from public and private donations and is therefore limited.

Social: As stated above the culture of Tijuana has a negative stigma surrounding HIV infection and those infected are often exiled. This is an issue as Tijuana has 3 times the density of HIV cases as the rest of the country, at almost 1% of the population in Tijuana [3]. By allowing them to have a safe place for rehabilitation, families can receive the help they need in a stigma free environment.

Technology: Tijuana is in a less developed country so the technology their citizens have access to is limited compared to that of the people in the United States. This limits the resources available for making Up House electrically efficient. There are large tariffs on imports, which makes it so that in most cases it is cheaper to use materials available in Tijuana, even if it is less efficient. One aspect that is not lacking is

landscaping and carpentry which are common professions in the area which comes in handy when construction takes place at the house.

Legal: The founder of Up House, Rosalva, has connections with the local government, which makes it easier to receive government funding as well as getting construction permits. One of the volunteers has influence in local government and looks out for the house if legality ever becomes an issue. This person can also help steer our project away from any potential legal issues.

Environmental: By lowering the energy cost of the house we are helping Up House economically and environmentally. Tijuana gets extremely hot in the summers (high 80 F) and cold in the winters (mid 40 F) [14]. With widely varying temperatures it is important to have good insulation and ways of combating the changes in temperature that are efficient otherwise it can be quite easy to run up a high electricity bill. Wind and solar energy are abundant in the area during the colder and warmer seasons respectively and could possibly be taken advantage of.

2.3 User Profile

The users of the Up house can be divided into children, parents and volunteers. The house serves as a welcoming community to each of these people where they can come together and talk about various aspects of their life in an open manner. Their user personas are as shown below in Figure 2.1 and while they are specific people, they share the values and roles with others and are simply representing that group at the house. User interviews for Figure 2.1 are in Section 3, 'Client Interviews', of the Appendix.

Figure 2.1 Personas of the different people at Up House. Child with HIV/AIDS (upper left), Church Volunteer (upper right), Mother with HIV (lower left), and volunteer (lower right)

Empathy Maps

The empathy maps in Figures 1.7 and 1.8 were created to help our team gain perspective on who our users are and how we can help them. Figure 1.7 is an empathy map of the parents who bring their children to Up House and Figure 1.8 is an empathy map of the staff. These two groups were chosen because they are the main people we worked with on our project and by analyzing these maps we were able to better connect with them. Figure 1.7, the empathy map of parents can be seen below and Figure 1.8 is viewable in the appendix.

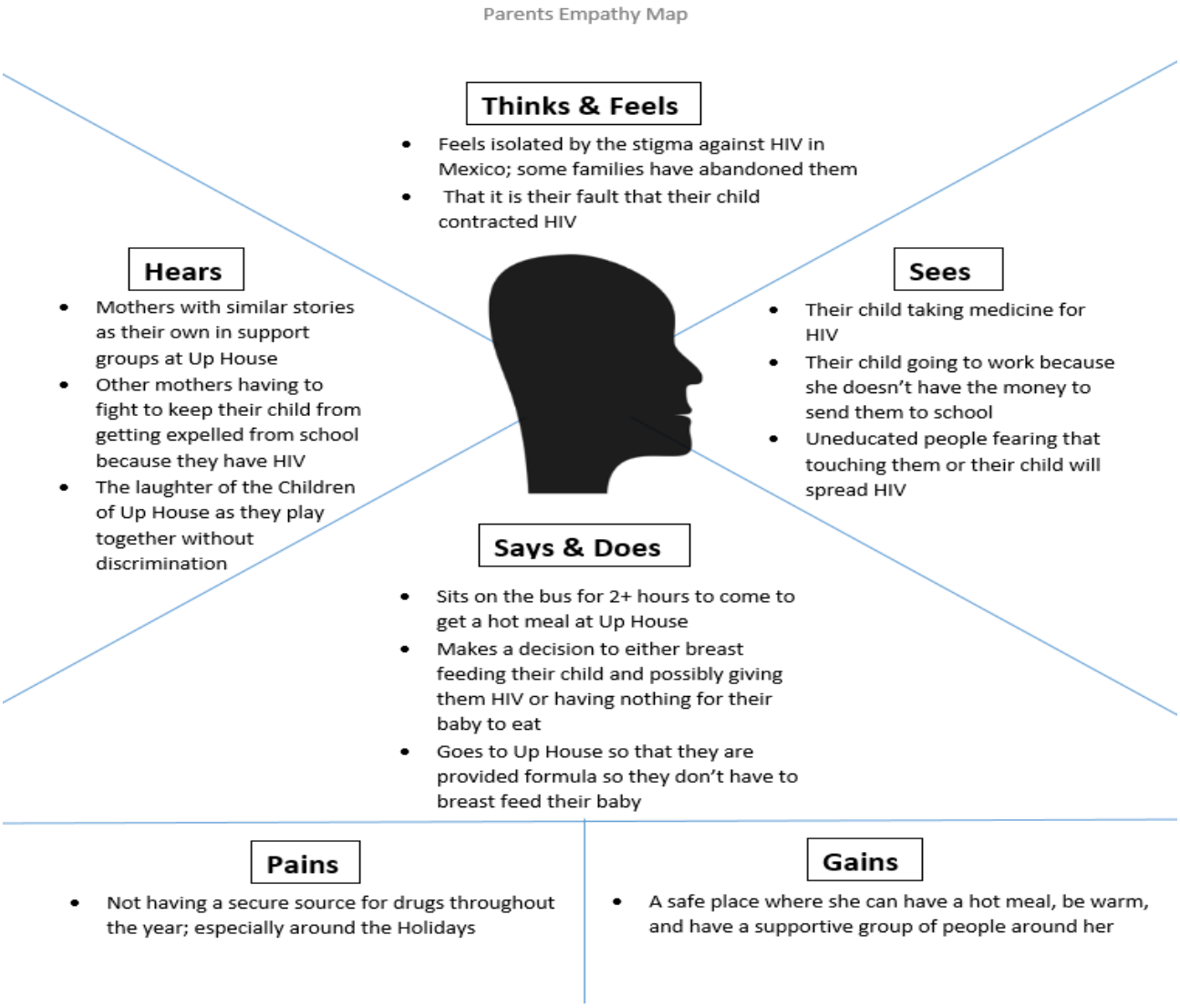

Figure 1.7 Parents Empathy Map

2.4 Design Specifications

Through user interviews and first hand observations we were able to identify key specifications needed for the house. These are organized in Table 1.1 below:

Table 1.1 Design Specifications

Functions & Use	• Regulate room temperature via evaporation by a few degrees. • Help keep the air from becoming stale. • Add aesthetic to office spaces.
Health & Safety	• Need to be safe for the children at the Up House
Maintenance	• Succulents must be watered at least once weekly. • User friendly - little to no maintenance required.

Cost	• Very inexpensive; will cost under $300
	  ○ Cheap to build
	  ○ Utilizes salvaged materials

Political	• Must be adaptable by the users in daily lives
Durability	• Must withstand the "intense" office environment.
Simplicity & Ease Of Replication	• Needs to be simple enough for the clients at the Up House to recreate.

2.4 Alternatives Analysis Survey

In order to gain a better understanding of potential solutions for our project we researched 5 different products that were already on the market. These solutions vary greatly but had all proven to be effective, energy saving solutions.

1. Tricks to Save Electricity [10]
Teaching people simple tricks to saving energy was an expense free way of cutting down on electrical costs (aside from time). It was important to make sure that people understood simple ways of conserving energy such as unplugging things when they are not in use. This also helped people in the long term if they started and continued to use these techniques. The problem was that people may overlook what they are taught and also may not understand the basics of why certain tricks save electricity. Small techniques could have been helpful but only if they continue to be used.

2. BBOXX B17 Kit [2]
A small PV system, shown in Figure 1.9, an easy way to implement solar energy. It was a relatively inexpensive means of installing PV system. Installing this would have been considered a 1st order change, which would've added to Up House's electricity but not power the house as a whole. It would've been complicated to fix if it ever broke which would not be ideal, as it could have become useless if it

Figure 1.9 BBOXX B17 Kit

broke and they couldn't fix it. If there was a way to make an easy guide to maintaining the system this could have been a helpful aspect of making Up House energy efficient.

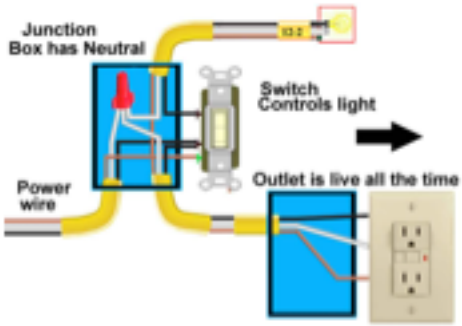

Figure 1.10 Junction Box

3. Junction Box [2]

This is a centralized switch or power brick that can disconnect electronics without unplugging them. An example of a junction box is shown in Figure 1.10. This was an easy way to have them conserve energy as it was relatable to just turning off the lights. It was relatively inexpensive and it would have a great impact as it would have reduced idle electric use by devices. One issue was that it required cutting holes into the walls of the house and the house had just been remodeled. Another concern was implementation. While we might have been able to implement the Junction Boxes, if anything went wrong with them after they were installed we wouldn't be around and the people at Up House may not have had the knowledge to fix it.

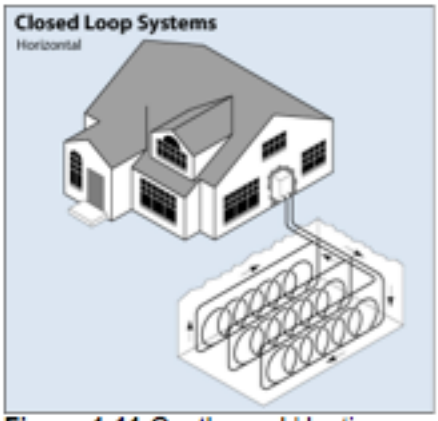

Figure 1.11 Geothermal Heating

4. Geothermal Heating and Cooling [11]

Shown in Figure 1.11, geothermal heating and cooling uses the near constant temperature of the earth to assist in heating and cooling the house. It was the most cost efficient and energy efficient way of heating and cooling a home. The issue was that it is extremely expensive in-between $7,000 -$15,000 and the net benefits could take years to occur. In our specific situation Up House was likely not be able to raise funds that could support a project like this. Another concern was that without proper insulation this solution wouldn't have been that effective and the house is not well insulated at the moment, which would add to the overall cost. It required extensive work, which would make the house an unpleasant construction zone for the children and would have required permits to start.


Figure 1.12 Soda Can Heater

5. Soda Can Heater [5]

A soda can heater is A soda can heater is a small solar heater made from simple and cheap materials. All the resources were available locally and it required a small budget to create. If something breaks it could easily be replaced and it did not require electricity to be powered. One problem is that it is not very effective during dark days. It requires sunlight to be work so it can be unreliable. This design in shown in Figure 1.12 on the right.

3. Concept Generation

This section goes over the three concepts we narrowed down to for our project. These included a succulent wall, an installed fan for ventilation and designing the second floor of Up House for good ventilation.

I. Succulent Wall, *Nature's A/C, an aesthetic way to regulate temperature.*

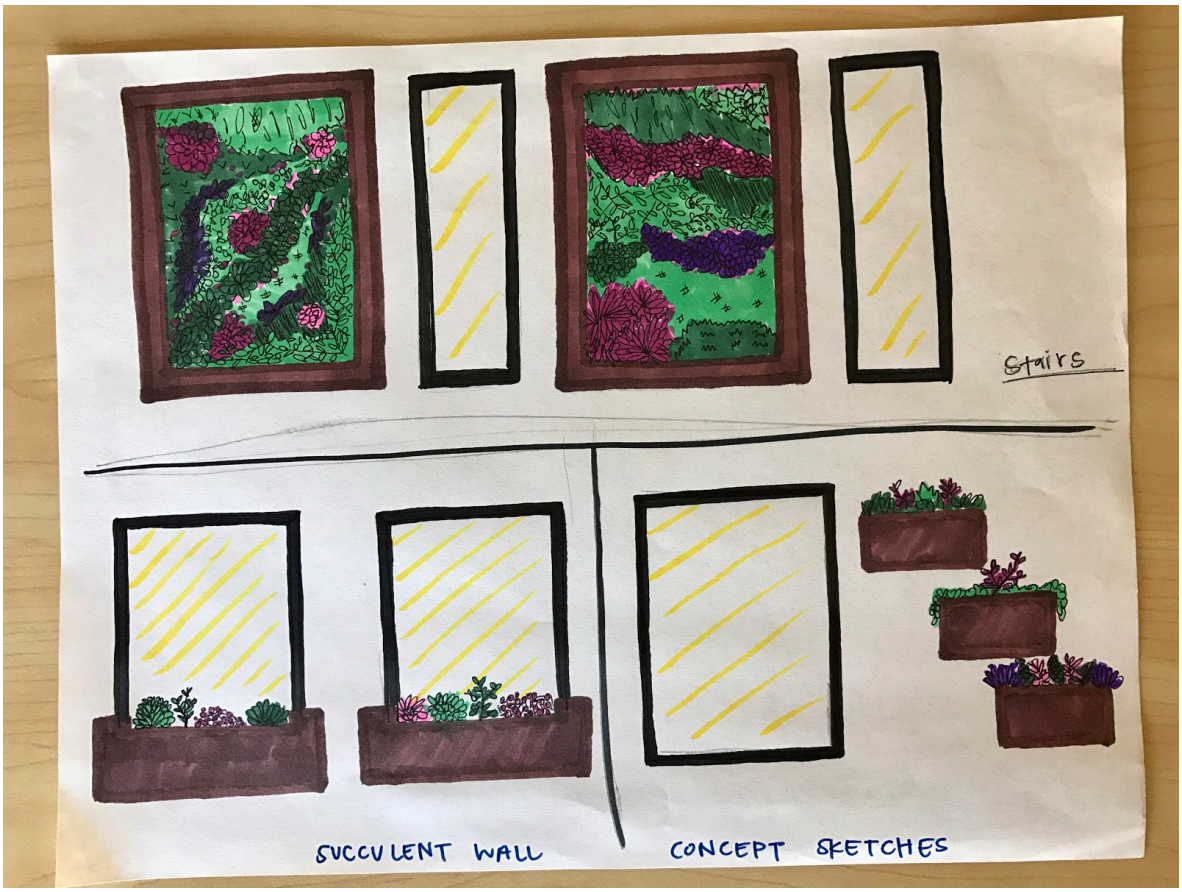

Figure 3.1 Different possibilities for implementing the succulent walls.

A succulent wall helps regulate temperature through its creation of humidity from the plants themselves and the soil they are planted in. As shown in Figure 3.1 there are a variety of ways to implement it. This solution is meant to help anyone that enters Up House. The goal is to help regulate the temperature so that people will not overheat in the summer or become too cold in the winter. This solution is unique because it not only helps with temperature regulation but also has an aesthetic appeal that creates a warm and relaxing environment. This is especially useful in Up House where the main users are dealing with a variety of issues from a family telling a child he or she has HIV/AIDS to simply trying to get supplies such as baby formula to keep babies safe from the disease their mother carries.

II. Air Flo, *Keep it Flo-in so overheating isn't an issue*

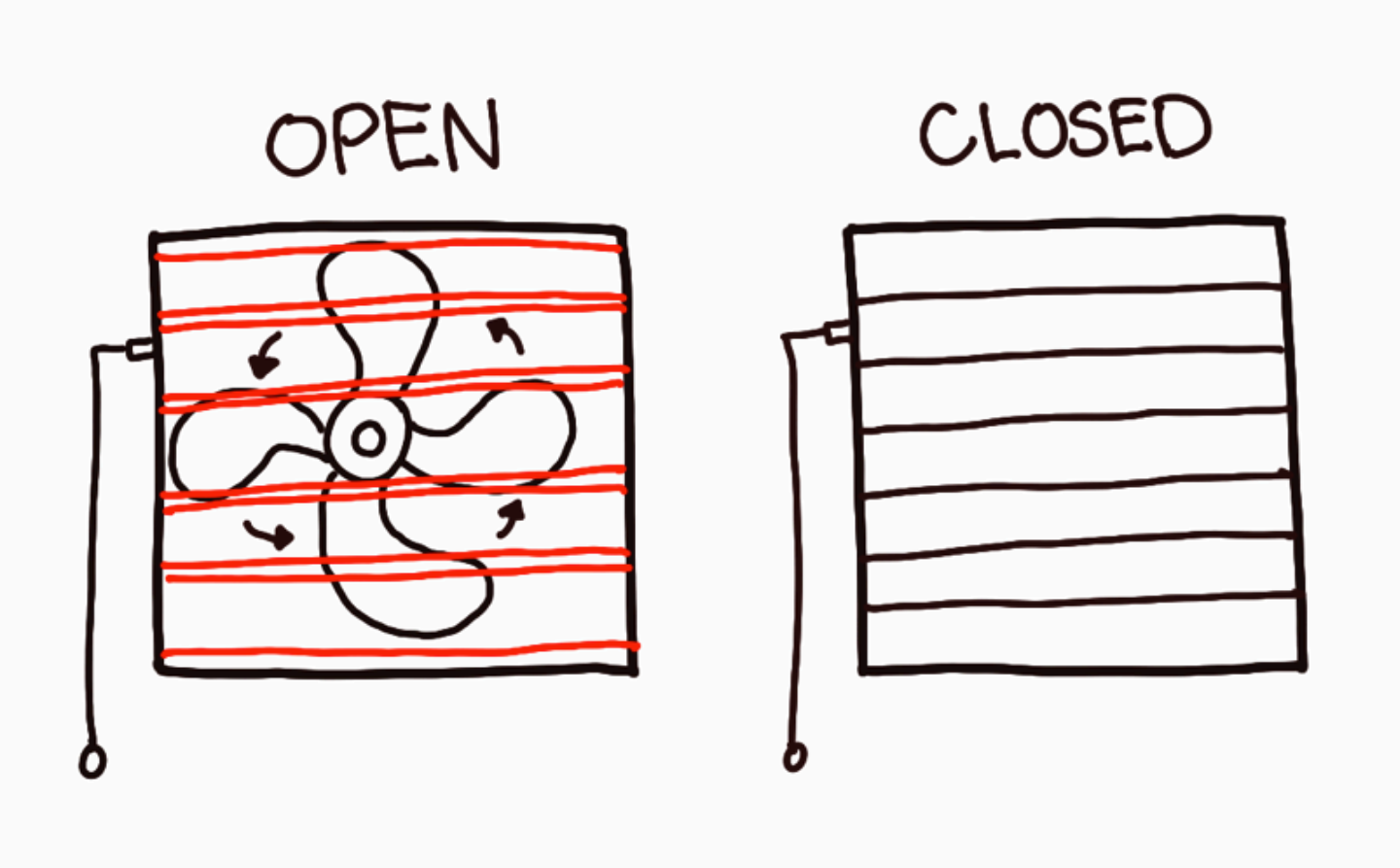

Figure 3.2 Sketches of 'Air Flo' showing the installed fan when it is open and when it is closed

Air Flo keeps the room cooler during hot days by actively circulating air through the house. It is a medium sized fan that would be installed in the walls. Users would be able to turn it on during hot days and it would act as an exhaust fan to actively circulate air in the house. This ability, as well as the fan itself, is depicted in Figure 3.2 above. In the figure there is a string to the left of the fan, this is used to open and shut the vent. It is intuitive and easy to use. Air Flo would benefit the staff and clients that are in the house during hot days. This solution is different from adding windows as it would actively circulating air even on days when there is very little wind. It has a low energy cost and is unique because it can be shut off whenever the staff or clients desire. It would be easy to create a manual in case anything goes wrong so that the staff is able to fix it and requires few supplies so it will be cost efficient to create.

III. Go with the Flow: *Easy, breezy office spaces to keep air flowing through a room*.

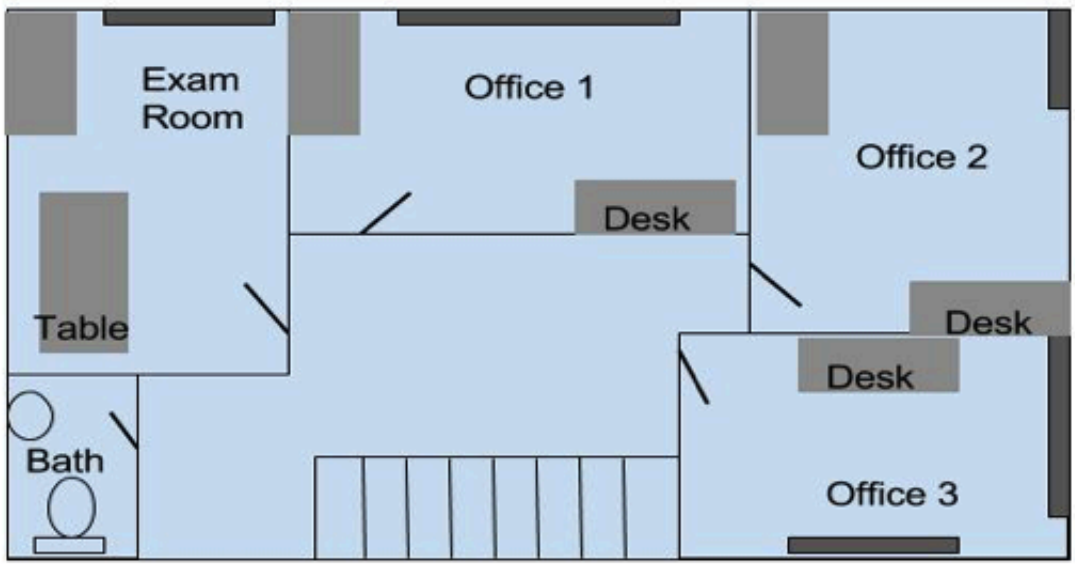

Figure 3.3 A sketch of the 2nd floor, including all aspects Rosalva is looking for.

"Go with the Flow" is a project of creating a floor plan for the second floor of Up House. The space is going to be redone soon and it is currently way too hot in the summers and cool in the winters for people to want to spend any time there. Rosalva wants to put several office spaces, a bathroom and a clinic on the second floor as depicted in Figure 3.3 above. This means there will be a large amount of foot traffic upstairs. The room would need to be configured so that all rooms have at least one window and a clear path to an open door. Less walls and less windows make for the ideal "Go with the Flow" design. The goal of designing the space for good airflow is to help regulate the temperature so volunteers, workers, and the families at Up House can have a comfortable and safe environment on the second floor. Without consistent temperatures the space will not be suitable for babies and small children and will lead to everyone being in an uncomfortable environment raising stresses in an already stressful situation (HIV/AIDS). This solution is unique because it requires little money but simply helping structure the room in a way that creates the most open space for airflow around the room. Once implemented it can easily be changed if the client decides she likes a different layout more. It allows for easy client feedback and does not require much money. It also allows us to help teach the people at Up House how to design a room for good ventilation.

4. Concept Evaluation

4.1 Desirability & Usability

Since we were unable to go to Tijuana to show our prototypes to our client for user testing, we FaceTimed with her and showed her pictures and described our plans (depicted in the Concept Generation section in Figures 3.1-3.3). While many people visit Up House, the only person we needed to test our ideas with was Rosalva. She is in charge of the house and makes the decisions of what can go into it and any construction that occurs. We will be able to test our concept with multiple users once we narrow our project down to one concept and have time to go to Tijuana. Below in Figure 4.1 is the Feedback Capture Grid, for the succulent wall. The other two grids can be found in section 1 of the Appendix as Figures 4 & 5. These feedback grids show the different types of feedback we received when speaking to professionals and to Rosalva, the founder of Up House.

Succulent Wall: This concept was a success with our client, Rosalva. She likes that succulents are low maintenance. The wall meets her need for temperature regulation in the house and a calming atmosphere for the families that visit. The succulent wall can be built in many ways and can be placed out of reach of the children. It is safe and easy to use. Overwatering is the only considerable user error. This concept improves air quality and is cheap to implement. One area it lacks in is overall temperature regulation; its' effect is much lower than other possible concepts. To improve the idea we will use large pots so the succulents don't quickly overgrow their pots and it will not have flowers to attract bugs.

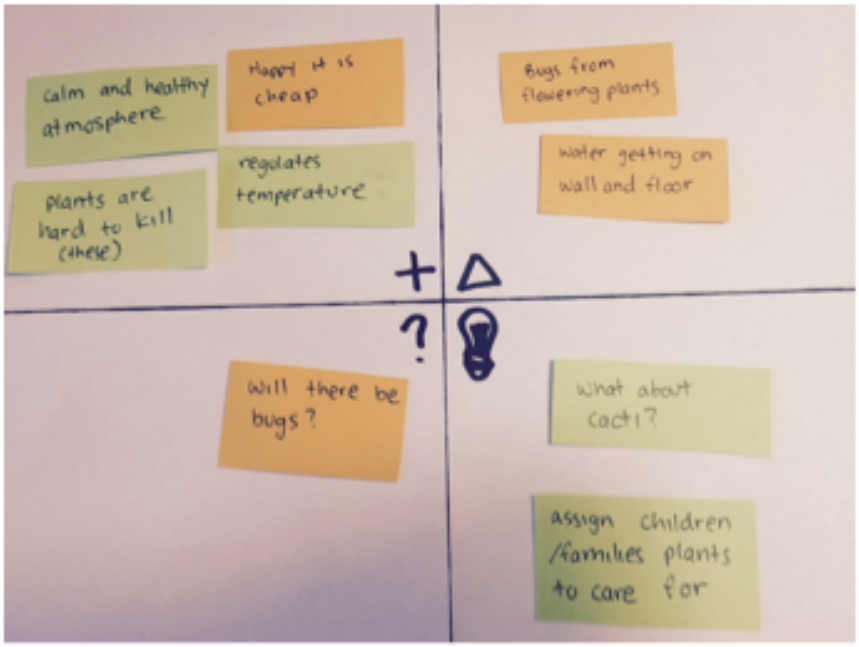

Figure 4.1 Feedback Capture Grid for The Succulent Wall

Air Flo: This concept was well received by our client Rosalva. We were able to show her diagrams and explain the concept to her over Skype. Her main concern with this concept was security. Having a hole to the outside could make it easy for burglars to break in. Air Flo is built into the wall and covered by a panel so children will not be able to stick their fingers into it, making it safe. It's intuitive and easy to use considering the user will only interact with a handle to open and close the vent. User error would relate to leaving the vent open on a cold day. It uses low energy and it helps regulate the temperature of the rooms. We can improve it by making it easier to fix incase it breaks. Also, we can make it less of a security concern by designing the vent differently.

Go with the Flow: After speaking with our client Rosalva she was willing to let us help design it for good airflow but already has set rooms. She plans on creating a conference room, office for the executive

director, exam room, storage, room for the social worker and a bathroom. This does not leave much open space for airflow. Redesigning the room is easy to accomplish since it only relies on moving furniture around and it is safe and not prone to error. The problem is the number of rooms Rosalva plans to construct in a small amount of space. The only possibility for this to work is by stepping through the construction processes and trying to direct Rosalva to create the rooms in the best way for airflow.

4.2 Feasibility

Succulent Wall: According to practiced landscape architect Sue Peerson, the feasibility of implementing a succulent wall is quite high (interview in the appendix). Many of the materials needed to build the frames for the walls can be sourced at the Home Depot located in Tijuana and Up House has salvaged wood that could help save on the cost of creating the physical frames. Living walls have been built in many locations such as on the Wesleyan College Campus [13]. There are many sources online which have a step-by-step guide to building these succulent walls [6]. This concept can be built by anyone and require little specialized skill or knowledge. According to the Australian Government, green walls can be implemented inside or outside buildings to help support thermal and sound insulation. Green walls have commonly been spotted throughout the country such as at the San Francisco Museum of Modern Art. These succulent walls are reliable as they can be implemented as an "evaporative" air conditioner to help regulate room temperatures. Managing the walls require minimal effort as succulents require little water and maintenance.

Air Flo: This concept involves using a large (1 ft^2 per 750 ft^3) fan the attic to blow air out from the top to create suction and constant airflow on the lower levels [4]. The idea of using ventilation to cool homes is feasible and proven. Natural ventilation is possible in places with natural wind by simply opening doors and windows. In places without this, fans are an option. Large, whole-house fans running at moderate speed can be quiet and effective. Another option is evaporative coolers, which use evaporation of water as a way to cool air and circulate it in the house. Proper ventilation paired with window covers and shading can be used to significantly cool a house. During this process, heat should be prevented from entering by using shades. These 3 main processes are depicted in Figure 4.2 below. If the team were to use an evaporative cooler the process of evaporating water removes heat, cooling the air being circulated. Testing this would be expensive, so the team relies on the testing and results of past researchers. The Air Flo method of cooling relies on fans, evaporative coolers and window coverings. The fans and coolers are pre built systems that go in the attic and awnings would be installed the windows. The capabilities of this method are cooler rooms with lower costs than AC. The plan is reliable as it only depends on a fan and windows. There is no complicated machine to operate or assemble. The only way for the system to fail is the fan to physically be broken or the windows configuration is wrong. By having a simple plan that is also reliable and easy to fix Up house can have a long-term solution to their energy problem. Also the vents for the airflow would be no different than adding windows when it comes to affecting the structural integrity.

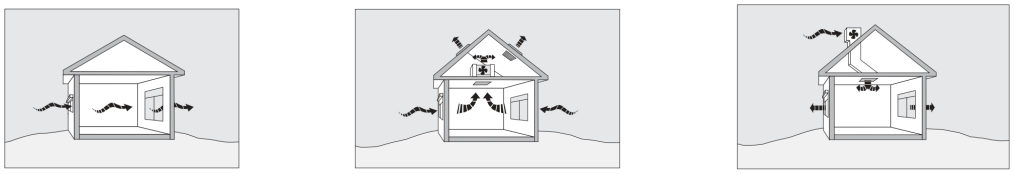

Figure 4.2 Natural ventilation (right), whole house fan (middle) and evaporative cooling (left) diagrams

Go with the Flow: This concept requires minimal differences financially for the house since our client is planning on redesigning it anyways. Once designed, the space needs very little maintenance. The user just needs to understand that any movement of large furniture would lead to decreased airflow and cooling

throughout the upstairs. One limitation for our project is the plan that our client has in mind. She wants two office spaces, a conference room, an exam room, and a bathroom. Having so many rooms upstairs poses a challenge because the more walls we put up, the harder it is to cool the room. Moreover, the orientation of the house does not support ample airflow from the wind. The back wall of the house, which has no windows, is southwest facing. In Tijuana, the majority of wind comes from the west [15]. This means that only three of the eight windows in the upstairs will be indirectly hit by the wind. According to the Green Building Advisory, direct wind is one of the most important factors in keeping a space cool, and direct wind only blows 12% of the time [8]. Moreover, this project is dependent on if there is wind blowing, and it only blows about 60% of the time. Therefore, 40% of the time there would be little to no cooling from this design. Overall these aspects such as Rosalva's construction plans make this project less feasible than the other two.

4.3 Ecological Sustainability

Succulent Wall: The succulent wall is an ecological sustainable concept because it requires minimal resources to build and maintain and it does not have any waste or emission besides carbon dioxide from plants. The resources needed to build the succulent wall are soil, pots, recycled wood for shelving and succulents. In addition, the only resource we need to maintain the succulent wall is recycled water. During our house visit, we noticed that there were wooden boards lying around at the back of the house. To decrease our impact on the environment, we will recycle these boards into succulent wall shelves. We will also educate the up house volunteers to use recycled water instead of filtered water. By doing so, we encourage ecological sustainability.

Air Flo: The Air Flo concept is the least ecological sustainable out of the three concepts. It requires constant use of electricity to facilitate effective active cooling of the house and the fan motor contains un-recyclable components and toxic materials such as aluminum, copper, and nickel. This means that this concept contributes to greenhouse gas emissions from the use of electricity. It is also not sustainable as the fan motor is created from materials that are highly toxic to the environment. The production of a fan motor contributes to the depletion of mineral resources and is potentially hazardous to the environment as it is non-recyclable. On the other hand, the other primary resources needed to build this concept -- plastic fan blades, metal arms, motor housing, fan casing, nuts, bolts, springs and security bars-- do not emit greenhouse gases when in use. However, all these materials contribute to greenhouse gas emissions during each individual component's production phase. After production, these materials can be reused which is sustainable. In order to make this concept more environmentally sustainable, we could have recreated the concept into a solar-powered fan. By doing this, we would have been able to completely eliminate the environmental impact caused by relying on electricity from the main power lines. It does not, however, eliminate the problems with fan motor, which would still be needed to build a solar-powered fan.

Go With the Flow: Go With the Flow is the most ecological sustainable concept out the three. It requires the least resources to build or maintain. In designing the Go With the Flow floor plan, paper and pen may be needed in creating a draft and a computer may be necessary in making the floor plan look more professional. With the use of a computer, it will contribute to the emission of greenhouse gases. In order to make this concept more sustainable, we can focus on creating this concept only on paper.

4.4 Economic Sustainability

These solutions would have improved the financial security and self-sufficiency of the client by helping them save energy through the act of maintain the temperature of the rooms at a comfortable level. Saving

them energy would have saved them money on electricity costs. Ultimately, it would have allowed them to worry less about their electricity costs and enable them to spend more on those that they serve.

Succulent wall: The cost of plants, pots, water and soil along with the installation of shelves was affordable for the user. A set of succulents (6) could be bought in Mexico for ~200 pesos and the lumber for the shelves would be taken from excess wood that our client has in their backyard [12]. Succulents only require a small amount of water once a week and therefore the price is inconsequential. Further cost analysis such as total cost of the wall and labor costs are assessed in section 5.4 of this report below.

Air Flo: Considering that the Air-Flo would be similar to that of installing an attic fan then it would've been okay assume that the costs are comparable. An attic fan in the home depot in Tijuana goes for about 500 pesos. Installation could be the real issue, as involved cutting relatively small holes in the walls of the house in order to install the fans. With that being said this solution might be expensive, but we considered it affordable. Basing the price of labor at less than 618 peso/hr. we can assume installation would cost less than 1500 pesos [12]. This product could have proven to be difficult to maintain, as it would require our client to have knowledge of electronics to repair the fan if it ever broke down. If we were able to give our client a fan that could be easily replaceable if broken, then it would have required little maintenance thus saving the client time and money.

Go with the Flow: Our client was already redesigning the second floor so there would have been no additional cost, though there may have been suggestions to purchase a different version of light bulb that is more expensive. This would be a one-time investment, which would make it economically sustainable. It would not have required any maintenance other than making sure that the windows are open on hot days to allow for air to flow through the room.

4.5 Socio-Cultural Sustainability

Succulent Wall: Up House would own this solution. Once installed, it requires no interaction with people outside of the user community. This solution is culturally appropriate since our client mentioned that the people in TJ are familiar with cacti and succulents are biologically very similar to cacti. This means we would not be introducing a new plant and people already know how to take care of them. Since succulents can survive without water over long periods and grow relatively slowly, behavioral changes will not be difficult for the users. A watering schedule will be implemented catered towards the staff and volunteers at the house to ensure that the plants are watered. Maintenance of the plants can empower the user with a sense of ownership and belonging and therefore promotes a positive environment. The user can reproduce it easily as these plants can be purchased in TJ and can also be improved upon depending on stylistic choices that the user is free to make. This would provide the users with an interactive, aesthetically pleasing setting while also regulating the temperature of the room. These plants would not affect the neighbors, TJ community or the Mexican government in any foreseeable way. Socio-cultural sustainability could perhaps be improved by allocating each family with a plant of their own that they are responsible for and bring to the house so that they are more invested in it's upkeep.

Air Flo: Air Flo was a solution designed to meet the client's need of active air circulation in the house and thereby control temperature on particularly hot days. This solution is owned by the people at the house. Once installed it requires no outside maintenance or upkeep and is solely operated by the users. However in the rare case of a breakdown, the users must contact people with knowledge of electronics to help fix the fan. This solution is culturally appropriate as it does not have any strong assertions on the users and can be used by each of the users with no difficulty. The only behavioral change that users would potentially need to adopt would be to consciously remember to use this solution when it gets too hot in the house.

Since this is rather intuitive behavior, it should be an easy change. For the most part, this solution does not need the user to depend on any outside sources and thus once installed, can empower the user to take control of the temperature problem inside the house. This solution can be harnessed, reproduced and improved by the user. Since the fans would be built into one of the walls the users can learn its workings and install them in other parts of the house as they deem fit. This solution will improve the overall experience for the families and staff using the house as well as help Rosalva and EUNIME reach their goals of introducing a comfortable setting. It could potentially bother the neighbors while being constructed due to the noise that is created, but this would only last for a short period of time and thus should not be too much of a burden. This solution does not affect the TJ community or the Mexican government in any way.

Go with the Flow: This concept was to maintain ventilation on the second floor of the UP house. The users own it because it involves designing the space in which they would interact. A key advantage of this solution is that it involves designing a space that the users have not interacted with before and thus would require no behavioral changes. The users can interact with the space as deemed intuitive while maintaining ventilation. The users will be advised to keep the furniture and other objects in place so that airflow is not obstructed. The user does not need to be dependent on any outside sources to maintain this solution since once this space is optimally designed, there is no maintenance required. In fact, the user can learn the best practices relevant to furniture placement as time progresses and thereby improve the existing design. The families and staff using the house would benefit from this design, as it would seamlessly improve the ventilation in the house. As Rosalva decides to design the space as per her earlier ideas, this solution will help her modify those designs. EUNIME, the neighbors, the TJ community and the Mexican government will not be affected in any way by this solution.

4.6 Concept Selection

Using the Pugh Chart, Table 4.1 below, we were able to determine which concept would be best to move forward with. In the chart, the characteristics deemed most important are listed in the 'Criteria' column. 'Energy Efficiency' was selected to decrease money spent on an electricity bill, and took into account the amount of energy used to operate the product. 'Aesthetics' was selected to create an inviting environment in Up House, 'Affordability' to minimize fundraising to pay for project, 'Ease of Use' to create an intuitive project with little room for error, 'Durability' to maximize lifespan of product and 'Safety' because there are a lot of children around the house. We decided the relative durability of the products based the number of parts that could reasonably break within two years of regular use. After completing the chart we determined that the Succulent Wall was the optimal choice to move forward with.

Table 4.1 Pugh Chart, a chart used to determine which concept has the highest ratings within our criteria

Criteria	Weight	Succulent Wall	Air Flo	Go with the Flow
Energy Efficiency	5	1	0	1
Aesthetics	2	1	0	0
Affordability	4	1	0	0
Ease of Use	3	1	0	1
Durability	4	0	0	1
Safety	4	-1	0	0
Desirability	5	1	0	-1
Total		**15**	**0**	**7**

5. Recommended Design

5.1 Overview

Figure 5.1 Front view of the Succulent Wall

The primary focus of our design was to develop an affordable, efficient and creative solution to the problem of high-energy consumption costs at Up House. To fulfill these requirements we designed a succulent wall, a concept that we believe would be easy and effective to implement. Having these plants indoors will help regulate the temperature of the room on hot days as well as improve air quality without using any electricity. The succulents will be installed into a hexagonal wooden frame and mounted on a wall close to a window on the second floor of the Up House as shown in Figure 5.1 above. The wood required to build the frame will be acquired from the salvaged wood already available at the house. The Succulent Wall is designed to be aesthetically pleasing to ensure that it is well received by the visitors of house. This solution can also help teach the families very basic gardening skills by giving them the responsibility of maintaining the plants.

5.2 Detailed Design

While we were determining our final design for the succulent wall we started off by having everyone draw out how they believed the wall should be designed. After this we narrowed down our designs to three options and created 3D prototypes of the designs. These prototypes are depicted below in Figure 5.2-5.4.

Prototype 1: Depicted in Figure 5.2, this design utilizes a system of slightly diagonal slots for individual plant pots. This could be mounted on the wall or on the ground and is watered from the front. This has the benefit of individual plant pots so that if a succulent dies it is easy to replace and there is no chance of damaging the other ones by messing with their roots.
Prototype 2: Depicted in Figure 5.3, our second prototype utilizes a single, vertical bed of flowers that has a slot in top water the plants. This prototype can be mounted or left standing. It also has a plastic lining on the back to keep the wall behind the plants dry when the plants are watered.
Prototype 3: Depicted in Figure 5.4, this prototype utilizes a hexagonal shape to efficiently pack the succulents into a vertical bed that can be hung or left standing. This idea would be watered from the front. The benefit from this design is that if more frames are made, they can be efficiently packed together to cover space. This design is also aesthetically pleasing

Figure 5.2 Prototype 1

Figure 5.3 Prototype 2

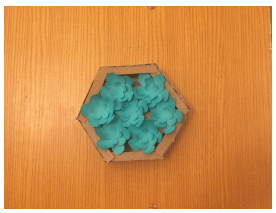

Figure 5.4 Prototype 3

Final Design: Our finalized design contains aspects of all prototypes show in the above Figures, 5.2-5.4. Our final design can be seen in Figure 5.5 below, a larger version can be seen in Figure 6 in the Appendix. The hexagonal design shape is aesthetic and efficient for the packing of the succulents. Plastic lining will back the frame of the succulent wall. This will prevent the wall behind it from being dampened when the plants are watered. It is designed for individual flowerpots in the shelves and has a diagonal wedge on the back to provide a slight angle to keep the water and soil in. Holding the plants in a non- upright position will also stunt their growth to prevent them from overgrowing. If the succulents do overgrow or die the individual plant can be removed and replaced without the potential of hurting the other plants. Proper placement of the frame is on an east-facing wall near a window, however when on a wall that is hit by direct sunlight the opposite side could be 10 C lower than a fully exposed one. This setup could possibly give the plants too much light. Finally, it will be easy to upkeep as the plants only need to be watered once a week [7].

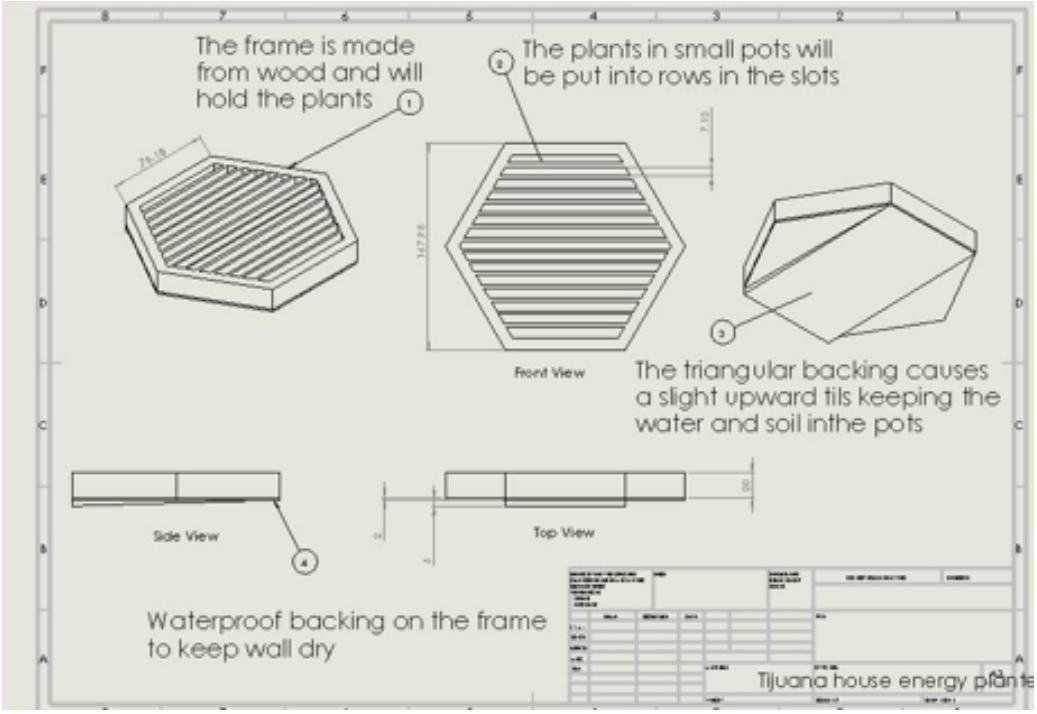

Figure 5.5 Final Design for the Succulent Wall

5.3 Implementation

To ensure that our succulent wall remains sustainable even after installation, we will ask our client, Rosalva, to participate in picking the succulents that she would like to have. We will also ask her and other Up House volunteers to help make the wooden frames with us. This will ensure that Rosalva and the volunteers will have a deep understanding of how the succulent wall works and how they can fix and make new ones in the future. In addition, we will also ask children from Up House to add soil and succulents into the wooden frame. Since these children were engaged in the creation of the succulent wall, they will feel a greater responsibility in making sure the succulents do not wilt. By allowing these children be involved in the process, we help them learn how to take care of plants. Below is a step-by-step guide to build the succulent walls using a hexagonal frame.

Step 1 (2 hours): Buy 10 succulents, a hammer, a saw, 30 nails, plywood backing and 4 wooden boards. These can all be found at the Home Depot in Tijuana (Av. Vía Rápida Pte. 14631, Guadalajara, 22430 Tijuana, B.C., Mexico)

Step 2 (35 – 60 minutes): Use the saw (electric or otherwise) to cut the wood. You will cut out 6 pieces of wood that are 18cm long for the sides of the hexagonal shape. This will take 3 of the boards, 1 board = 2 sides of the hexagon. Next you will cut 2 pieces of wood that are 25.5 cm and 1 that is 36 cm long. These are for the slants separating the succulents into rows.

Step 3 (40 minutes): Take the 6 18cm boards and lay them out in a hexagonal shape. Take 2 boards and put them at a 120-degree angle to each other as shown in Figure 5.6. Put 2 nails through the boards each about .5 cm inward from the edges as shown in Figure 5.7. After the first two boards are combined repeat the process until all 6 boards are nailed in.

Figure 5.6 The boards' need to be at a 120 degree angle to each other

Step 4 (30 Minutes): Trace the hexagonal frame into the plywood backing and cut accordingly. Afterwards use glue to attach the plastic lining to the inside of the backing. Then put the wooden backing on top the wooden frame and screw it in. Make sure the plastic is screwed through as well. Each corner of the hexagonal frame should have one nail in it.

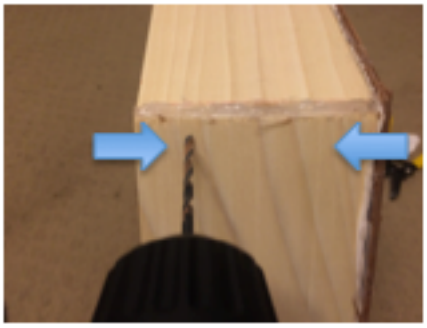

Figure 5.7 The two boards should be nailed together, 2 nails one for each side

Step 5 (20 minutes): Attach the inner parts of the hexagonal frame. Use the 36cm board for the middle shelf and the 22.5 cm boards for the outer shelves. Wedge the 36 cm piece into the middle of the hexagonal shape shown in Figure 5.8. The use two nails on each side to nail it into the frame as shown in Figure. 5.8 For the two 22.5cm pieces you should be able to put them into the frame and push them into position. Then nail them in like you do for the 36cm board. You are now done creating the frame.

Step 6 (10 minutes): Add the succulents to the frame by placing them in one by one. After they seem secure add more soil in between the plants. (do NOT remove the plants from their individual pots otherwise it can be difficult to replace them later if their roots become intertwined)

Step 7 (20 minutes): Attach the wooden frames to the wall and ensure that the succulent wall is stable and will not fall.

Figure 5.8 Shelving nailed in at an angle

5.4 Cost

Table 5.1 below lists all the costs associated with building the succulent wall. Our client, Rosalva has salvaged wood that could be repurposed to build the hexagonal frame and shelving which would significantly help to save costs. Many of the materials, such as the hammer and nails could also be items that are already present at the Up House but were added into the calculations as a safety measure. Much of the labor required for the succulent wall can be done by members of Eunime and requires technical skills that can be taught through a short educational tutorial. The succulent walls are also very sturdy and will require little to no maintenance aside from the minimal watering that must be done to keep the plants alive. The walls can be built by the members and clients of the UP house together as a team and thus the price of labor/maintenance was deemed to be priceless as it is an experience that can help

strengthen the bonds of the organization. Since the walls can be built after a short educational tutorial the estimated cost will be in man-hours totaling up to 5-8 hours per succulent wall. The first succulent wall would cost $115.56 USD and additional units would cost $60.00 USD to construct and implement. These costs are based on purchasing the items at a Home Depot store in the US. However, Rosalva has stated that there is a Home Depot where she can source the materials in TJ. This option would be much cheaper than importing materials in from the states as international tariffs are avoided.

Table 5.1 Costs of the Succulent Wall

	Part	Vendor	Part #	Unit Cost	Quantity	Subtotal (Pesos MXN)
Capital Costs	Wooden Shadow Box (Hexagonal wall frames)	Rosalva	N/A	N/A	3	Free
	Hammer	Home Depot	N-A10SHD	$4.96	1	$4.96
	Nails	Home Depot	8CTDSKR5	$9.87	2	$19.74
	Plywood Backing	Home Depot	448887	$8.97	3	$26.91
	Succulents	Local	N/A	~ $1-$3	60 per wall	~ $60 - $180
	Wooden Seal	Home Depot	LS128	$37.97	1	$37.97
	Plastic Sheeting	Home Depot	HSHD09-40	$19.98	1	$19.98
	Labor	Everyone	N/A	70pesos /hr.	2-3 people	$300
On Going	Maintenance	Everyone	N/A	N/A,	1 person	2 man hours

5.5 Assessment

The costs and benefits of our project are contained within Up House and affect only those that spend time in the house. This includes volunteers, workers and the families dealing with HIV/AIDS. Our goal for the project was to create a cost efficient way of regulating temperature in the house. The succulent wall is cost effective as shown in section 5.4. While the succulent wall will regulate a room's temperature, it does not do nearly as good of a job as something such as a heater, which require large amounts of electricity. This solution is aesthetically pleasing and our client is excited to have plants in the house that can also help maintain a good temperature for the people that spend time in it.

The short-term effects of the succulent wall include the upfront cost and work hours. Rosalva, the head of the organization, will have a fundraising event for the money to buy the materials for the wall. There should be very little money needed for this project after completion. Aside from implementation and costs to build, the wall should have few short-term effects.

The long-term effect in terms of costs include the little amount of water to keep the succulents alive, replacing any that die and fixing any damage to the wall that may occur. Due to the plastic lining against the wall of the house we do not believe dripping water will be an issue. The succulent wall will be ecologically friendly. It only requires a small amount of wood and nails, the plants require very little water and no electricity is used once the succulent wall is in place. The only potential problems from our design are if water leaks through the back and the wall that the succulent wall is attached to gets damaged. The only way to determine if this occurs is to construct the wall and spend a few weeks using it and then check for damages before setting it up in Up House. Over time the wall will help regulate temperature of the house by creating humidity. If we had more time we would take the temperatures in a room for a few weeks and then add the wall and continue taking the temperature to see the variation and if the effect is noticeable. This would need to occur in both the summer and the winter. We hope that each child will be assigned a plant to take care of and over time they will learn valuable lessons about responsibility. Another aspect of the wall we would have liked to testing is seeing how often succulents die and what areas of the Succulent Wall they are in to confirm they are getting enough sunlight and water and that our design is optimal.

Table 5.2 Metrics to Determine the Success of the Succulent Wall

Construction Cost	Costs Less Than $100 USD to Build
Recycled Materials	More than 50% by Weight
Time to Build	Less than 3 Hours to Build
Water Resistance	Water will not seep through back
Maintenance Cost	Less than 15% Build Cost per Year
Insect Attractiveness	Succulents will not attract insects
Energy Usage	Requires no energy after construction

Table 5.2 depicted above, shows how we will determine the economic, environmental and ecological impacts of our project. If our product passes all of these criteria it will be considered a successful project. Construction costs were used as a criterion because our client has to fundraise all of the money to fund the project so it needs to be inexpensive. Second, we need to use 50% recycled material in order to keep our environmental impact to a minimum. Third, the succulent wall needs to take less than 3 hours to build in order for us to be able to build it during our short trips to Tijuana. The project must also be water resistant because one of our clients most pressing concerns was that the succulent wall could potentially leak through and damage the wall of the house behind it. The wall is supposed to be a long-term solution so minimizing maintenance costs to less than 15% of the build cost will ensure that. Our clients other concern with the project is that the succulents used may attract insects so to insure that that does not happen, we will use succulents that will not attract insects. Moreover, our project will use no energy after it has been installed. With our current plan, our project will meet all of these objectives.

6. Conclusions & Recommendations

In our project we were unable to address all of our clients needs such as lack of funding, an unfinished house, and unalleviated poverty as they seemed out of our control. We focused on helping our clients by trying to help them conserve electricity at the house. Our research was focused on trying to find the cheapest, easiest, and most effective temperature regulating solutions. Of the concepts that we developed the succulent wall was the best option as it used a natural process, moisture retention of plants, and it worked to keep the house cooler during hot days. This solution was a great fit for the house because our client would have to spend very little money to maintain it.

It was important to us that we deviated from complicated designs that need electricity to function. The design of the succulent wall has proven to be more organic, inexpensive, and functional. While functionality came into question if one compares our solution to something like installing an air conditioning unit, which could have regulated temperature better, the benefits outweigh the cost of an electricity-powered solution. This was a trade off that came with trying to implement impactful and inexpensive solution. For future work we recommend that if the succulent wall proves to be successful, more plants could be put around the house, preferably large potted plants. We were unable to teach the people of Up House common energy saving tips, which in retrospect would have been very helpful to them. We created a list of smaller energy saving solutions that the non-profit could implement. We recommend a future team put together an energy saving curriculum and look for another cheap means of saving electricity. Hopefully, by the time that the house is completed there will be other practical and organic solutions that can be developed. A future team could develop a heating solution or possibly implement solar heaters that we mentioned earlier in Section 2.5 of our report. Perhaps they can work on the centralization of power switches in the house that would make it easier for the people of Up House to turn off their devices and in turn save electricity. It is difficult to determine other kinds of directions for this project due to the harsh reality of their situation. After working with them this quarter it has become clear to us that there is room for educational and empowerment programs for the kids and family of Up House. Further energy saving projects should be implemented.

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Appendix

1. Figures and Tables

Figure 1: 2nd floor of Up House There is no installation on the roof or the walls of the second floor. This allows heat to escape in the winter and heat to get in in the summer.

Figure 2: First Floor of Up House There are no curtains on the windows, which leads to direct sunlight entering the rooms and heating them up much faster.

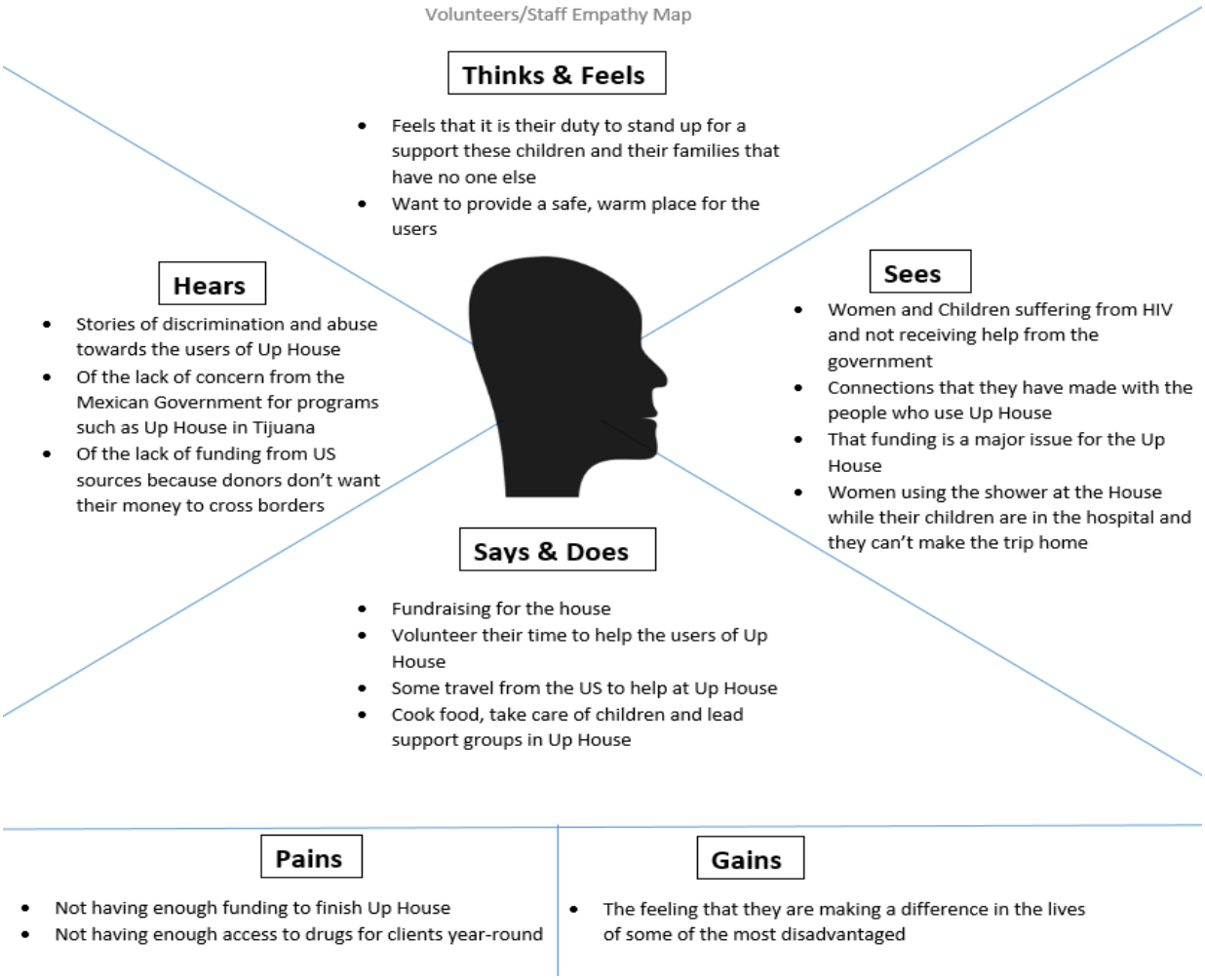

Figure 3 / Figure 1.8 Volunteer/ Staff Empathy Map

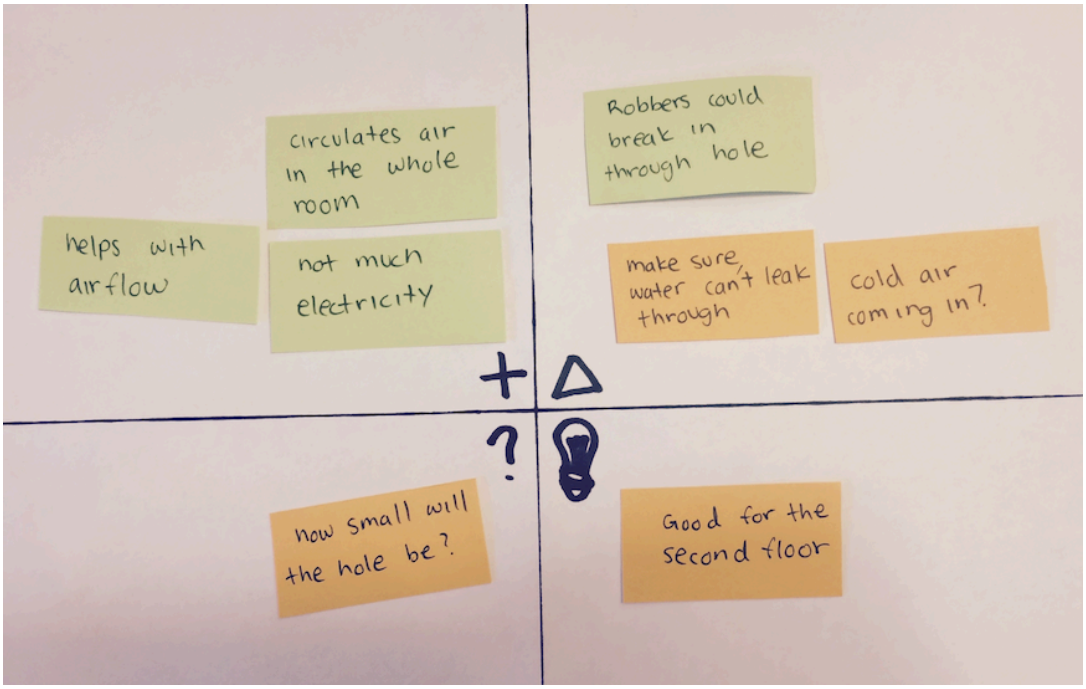

Figure 4 Feedback Capture Grid of Air Flo

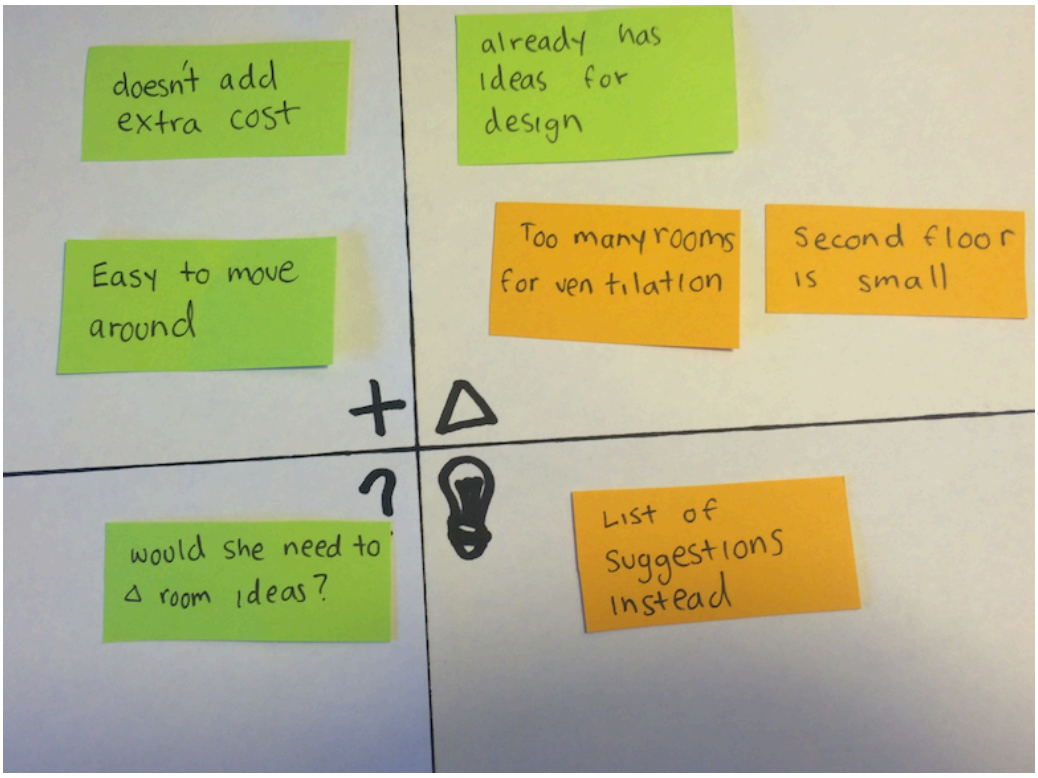

Figure 5 Feedback Capture Grid for Go with the Flow

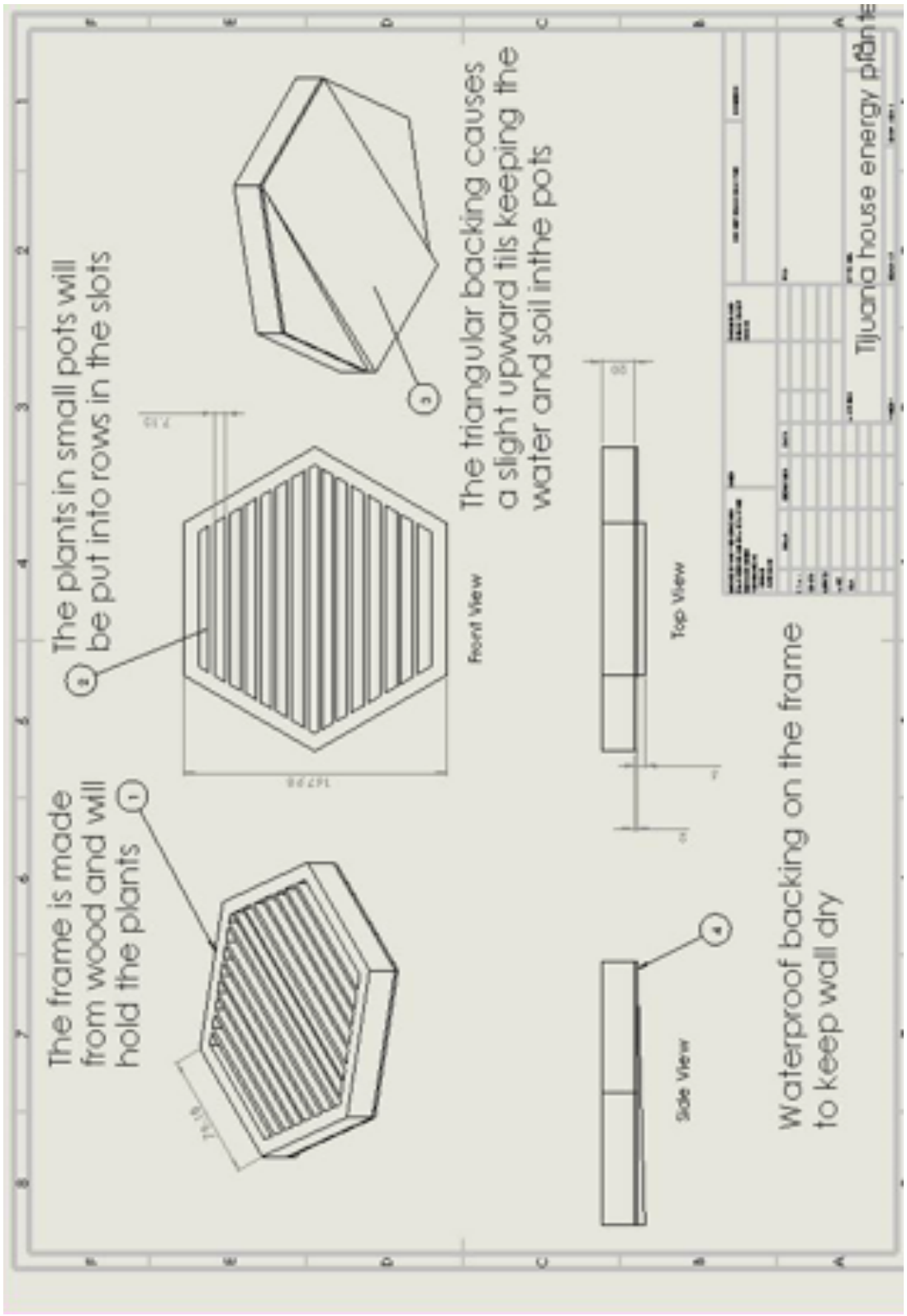

Figure 6 Enlarged version of the final design for the succulent wall

2. Expert Interviews

Interview with Sue Peerson 11/10/16

Peerson is an Urban Studies and Planning Professor at UCSD as well as a practiced landscape architect. This interview was used to get feedback on our concept of the succulent wall.

Do you think that implementing the Succulent Wall is possible?

As Succulent Walls are commonly seen throughout the US, it is very likely that it can be implemented. There is a great example at the San Francisco Museum of Modern Art.

Any recommendations on the best way to implement it?

Try using a lightweight soil to decrease the weight of the overall wall. Epiphytes are also a good option as they survive through air and require very little soil.

3. Client Interviews

Interviews 10/22/16

Darian – Volunteer, Age 18

How did you get here?

- "I come with the church organization and friends to give my services"

Why do you keep coming back?

- "The need for help and the connection that I form with the clients"

What would you like to see happen in 5-10 years down the road?

- "I want the people to feel safe. I want them to have somewhere to stay."

Victor – Client, Age 14/ 3rd Grade

How did you get here?

- "Via public transport"

Why do you come here?

- After thinking about it he raised his shoulders and shrugged. He didn't know why he went.

What is your favorite part about the Up House?

- "I like how they welcome me here and how they greet me."

What do you like to do?

- "I like playing soccer with my friends."

Marie Elena – Volunteer, Age 53

How did you get here?

- "Via public transport. It takes me two busses from the city center"

Why do you come here?

- "I come to volunteer and help give people my service."

What would you like to see happen in 5-10 years down the road?

- "I would like to see everyone getting along."

Joselin – Volunteer, Age 16

How do you get here?
- " I take the busses from Cabrera."

Why do you come here?
- "I started coming along with my grandmother (Marie Elena). I come to help"

What would you like to see happen 5-10 years down the road?
- "I'm not quite sure. I'm not very imaginative"

Side Conversations with Joselin
- "I passed high school and I'm waiting to study for {La Preppa} but there is a lack of paper (resources)."
- She works part time at a print shop and is happy with what she has in terms of clothing. She likes to watch anime and listen to music - Don Diablo.

All day Interview with Rosalva

- Rosalva mentioned that the first thing she must do is feed all the clients that seek out the Up House. Clients take multiple buses for two hours to seek out services. She mentioned there was insufficient funding for food.
- Multiple issues bringing items over the border.
- Some of the children were expelled from school because they tested HIV positive. Rosalva and her team had to lobby with the school in order for the children to stay.
- Mexico is "25 years behind" the United States.
- They lack clean water so they have to buy water from the store.

Interview with Rosalva 10/12/16

1. What do you expect to get out of these 8 weeks?
Not sure, she says it's her first time working with global ties.

2. Why did you join this organization (did she create it?)
She noticed that there was no government aid for people that are diagnosed with AIDS. She started the organization after her son was diagnosed with HIV in the 80's.

3. What do you see as the biggest problems regarding the project?
The rooms are really hot during the summer and really cold during the winter

4. Can you walk us through a day at the house?
She isn't always at the house. She described herself as always being in and out of the house because she is fund raising.

5. Can you name the various tasks that must be complete throughout the day?
Weekends they host support groups for the families.

6. What is a resident's day like at the house?
No one lives at the house so there are no residents. The people who come to the house come from all over Tijuana. Most of them live in poverty and take a 2-hour bus ride to the house. On the weekends there are support groups for the families. The clients come to the house for education, support groups and eventually psychological services.

7. Do people receive food while at the house?
Yes, they do give meals at the house.

8. How do you distribute supplies?
The clients come to the house.

9. How do people find out about your services?
People find out about the service through a partnership with the local hospital and via word of mouth. The hospital refers people to the house.