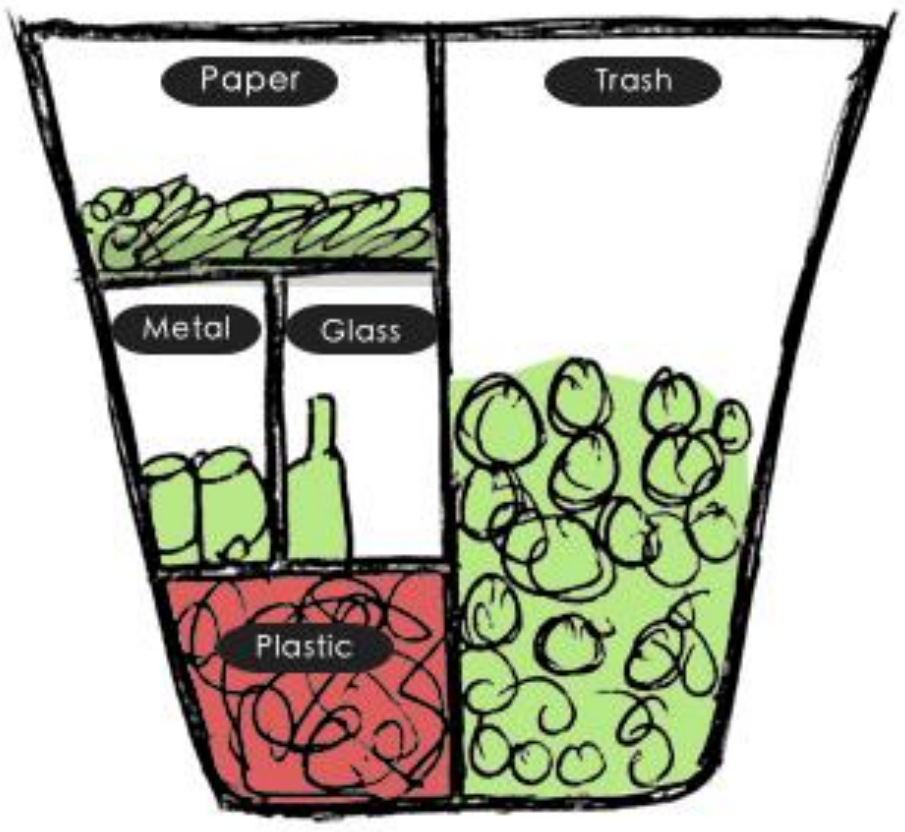
ECOYOU

AN APPLICATION TO PROMOTE SUSTAINABILITY IN NEIGHBHORHOODS THROUGH BETTER WASTE MANAGEMENT



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Digital Prototype: https://invis.io/F99KD2VGE

Introduction

What is your contribution towards a sustainable future? The environment is just another commodity that we use for our purposes, and we do not end up caring so much about it at the end. Most people in various countries are unaware of what impact they have on their environment. America is ranked last in sustainable behavior in the Greendex report, which is a survey conducted by the National Geographic Society and GlobeScan. The report explored environmental attitudes and behaviors among 17,000 consumers in 17 countries through an online survey that asks questions relating to housing, transportation, food, and consumer goods. Consumers in India, China and Brazil, faired higher in this report with scores around the fifties. If one is not aware that a problem exists then, they do not work hard towards making amends.

Growing up, I saw my city which was once termed the 'Green City' in India turn into a town filled with trash. The exodus of the population, IT boom and uncontrolled pollution, a disorder in waste management has resulted in a huge hit on the environment. Barren lands become dumpsters for few neighborhoods. People throw trash anywhere. To Summarize there are a lot of issues to be dealt with and a hierarchy of officials to blame for such a disorder. As an individual, I feel I can be the change by starting small and if everyone develops such a feeling we could together make a huge difference.

Have you watched the movie Wall-E? That was a brilliant effort by the director, Andrew Stanton to show what disregarding one's environment can result. With SpaceX planning missions to find an alternate home on Mars, we are not far from such a scenario.

Many individuals and organizations continually strive to conserve the environment, but, a large part of the population is still unaware of their impact on the environment. I want to change this reasoning of people so that the next generation turns out to be more connected to their environment.

Problem

Back at home I constantly observed how people managed their waste and as I analyzed the situation, I felt the issue was in perception. Recycling is not mandatory in my City. The government had not legalized waste segregation until recently. In a neighborhood of 10 families, probably only 2 segregate waste and recycle. Another issue was with the improper waste collection. The authorities would pick-up the waste on alternate days, and due to the mismanagement within the Municipality office, the staff at the low-level of the hierarchy are unmonitored. These issues have resulted in waste pick-ups on odd days making the residents frustrated with such a system. The way residents dealt with this situation was to throw the waste to barren or empty lands nearby, and over a period, the waste would seep into the ground, and become part of "our neighborhood". A similar issue persists in various neighborhoods. Youngsters too do not care about where they throw waste and this

disregard for their environment is unbearable. The situation is similar in many parts of other developing countries and the USA.

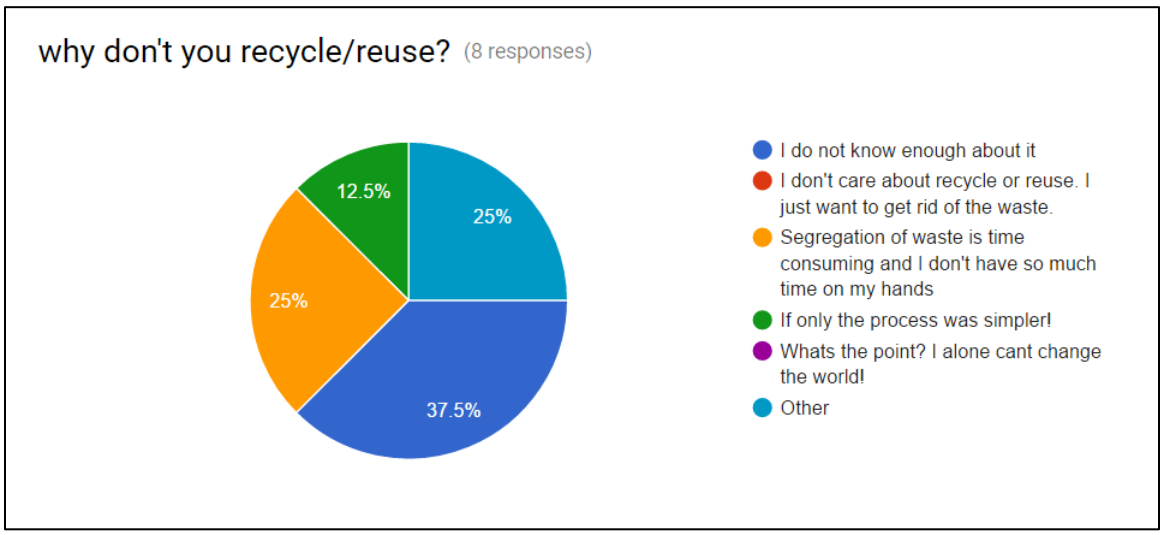

Figure 1 : Responses from the survey

Every year we consume plenty of resources and generate massive amounts of waste. How often do people look back and think of reducing this consumption? Or reusing or upcycling some of the waste items? It all starts at our homes. Each one of us could be a small change, but how many of us strive towards this? User research suggests that families recycle but are genuinely unaware of what happens to the recycled materials? Where does it go? This gap in understanding their impact on the environment does not motivate them towards sustainability. If parents, feel so then kids (future of tomorrow) growing up in similar environments do not learn to empathize towards their environment either.

Solution Overview

Throughout this project, I juggled between various ideas. From having an application that helps educate residents in a neighborhood to an IOT device, I explored it all.

It was during a peer group brainstorming session that, I realized a solution that was more than just a digital interface would be appropriate for this project. Finally, a survey of my users helped me decide on a mobile application which leverages on three of the main concerns reported by users about waste management. The concerns being, improper waste pick-ups, no knowledge of their impact and lack of motivation.

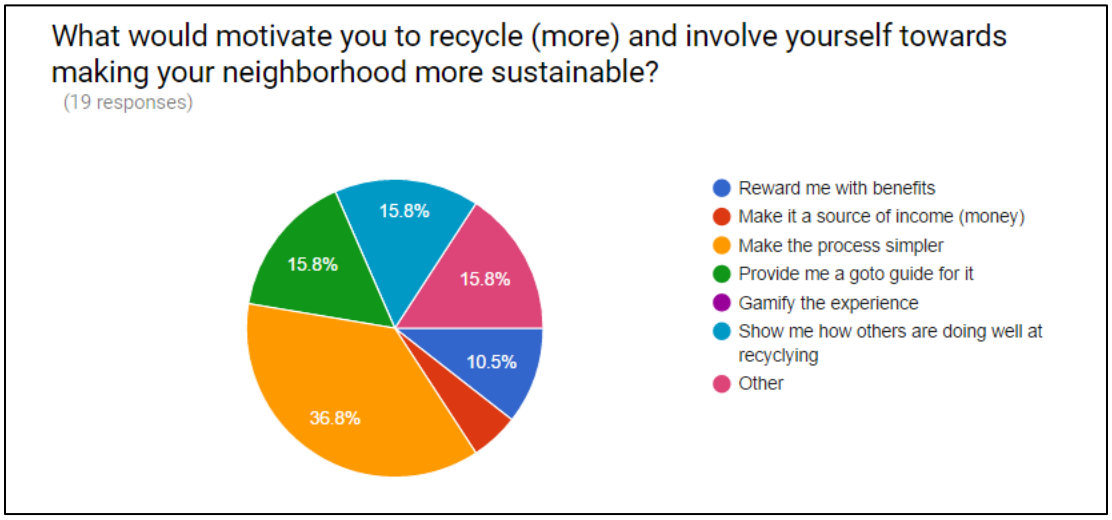

Figure 2: Motivations for recycling

Final Design

The final design uses a smart bin that tracks waste consumption and recycling habits of a family to educate them about better practices for the same. The solar powered smart bin can be installed on the wall outside of one's house. The bin has two compartments, one for trash and another for recyclable waste. The compartment for recyclable waste is further divided into paper, plastic, metal, and glass sections. Each of the chambers/sections has a weight sensor attached to them to effectively measure the generated amount of waste of a category. The bin contains a good compressor inside the trash compartment to improve waste storage. It also provides wireless connectivity, which is essential for analyzing the consumption data. Such a bin is deployed at many houses within a neighborhood. The data from individual homes is analyzed, aggregated, visualized for a family to give a sense of where they stand regarding their impact on the environment.

FUNCTIONALITY

In this report, I will dive deeper into the features designed for the mobile application rather than the smart bin features. The critical features of the application are:

TRACK MY USAGE - where in a family can view the eco-visualization of their consumption data on a day to day or a month to month basis. It also notifies them when a compartment in the bin is full.

MY PROGRESS - helps user's keep track of how well they are doing at waste management by comparing their current consumption to their previous use of resources

IMPACT ANALYSIS - helps families realize their impact on their neighborhood, city or even the world by comparing their information with that of average families in their neighborhood or city or other users of the application around the world.

KNOW MORE - section of the application brings about learning especially for kids by educating them on home waste disposal techniques, landfills in their city, waste treatment processes, recycle and reuse in an interactive way.

RECYCLE an EARN - is a feature to help users realize how much their recyclables are worth to motivate them to earn more by recycling more.

To give more context of the application use, I shall present a typical login scenario.

- The user receives the product (a smart bin), turns it on and connects it to the home Wi-Fi using the instructions in the product manual
- The user then downloads the application from the app store
- Initially, a screen highlighting the MVP of the application is presented to the user. The user chooses 'Sign Up.'
- The application requests for the user's family name [which must be unique] and zip code.
- The user must enter his name, email-id and age further and enter the same details for other members of his family. The application recognizes the number of household members from this information. This information is used later to find the average per person usage within their neighborhood.
- The user must enter the device-id of the smart bin further and pair the device.
- The user is prompted to set a password, choose a profile photo. The user is also requested to provide a consent to use their family's consumption data on the cloud.

I prefer to keep a single login feature for the entire family. The email-id information of different members of the family is requested for notification purposes alone.

CRITICAL FEATURE – IMPACT ANALYSIS

For families to know their impact, it is necessary to show them where they stand to others in their community. Some of my interviewees mentioned that such a feature would indirectly motivate them to contribute more. "Knowing how well my neighbors are doing, would in a right way put some pressure on me to maintain or reduce my families waste consumption". Another interviewee said "Competition is good and I'm okay with it as long

as my family is anonymous to others. If I knew the Smiths next door recycled less than me, it would be like pin-pointing which is not constructive for the neighborhood."

For these reasons the application aggregates the data from an area and provides an average per person per family consumption or recycling traits within a neighborhood. E.g.. If you have a family of ten and your community is filled with families of four, then comparing your family (10 people) waste consumption with that of an average consumption of a family (4 people) is not accurate or helpful. Or these reasons the application finds a per person waste consumption/recycle an average of your neighborhood and multiplies it by four for your family for a better assessment.

To facilitate personalized visualizations for families with kids, the age of the household members is considered. This way the application offers a pictorial representation for a family with children and a graphical representation for a family with teenagers or adults.

SCOPE FOR IMPROVEMENT

In the user testing, one of the users appreciated the idea calling it a "novel application". Some of the users gave me better insights into the breakdowns in the application. Based on these suggestions, the following are some of the improvements I would like to add to the application.

- Reduce the burden on the user to choose a unique family name by suggesting some of the available usernames
- Instead of asking for the user to feed in their information (Name, email id and age) and information about their family members together, allow the user (who is signing up) to register first followed by their family member registration.
- Smiley's are not universal, so the 'Impact Analysis' page could describe their performance instead of using just smileys to show this
- Add features like 'Upcycle suggestions' or a community forum for residents to discuss the environmental issues faced in their neighborhood.

TOOLS AND TECHNIQUES

Initially, during the brainstorming session, I drew most of my ideas on paper. As I progressed, I found myself to be more expressive on paper. Hence, I sketched out my thoughts, for the helping users understand my idea during the interviews as well. As I am new to digital design, I wireframed on paper, after which I made a paper prototype of the interface using the standard tools available at home like post-its, tape, sketch pens, etc. Initially, for the digital prototype, I was confused about using Adobe Illustrator or Sketch, but I resolved to use Sketch application on a Mac to create my screens, as Sketch was more intuitive and easy to prototype in. The application logo was created using Adobe Illustrator. To create an interactive digital prototype, I used InVision app. I cannot highly talk about

the pros of these tools as I'm new to interaction design and its tools. Although as a first-time user, I will upvote sketch.

Design Process

I followed the user-centered design approach for my project. I had to at times use reflective design to decide if a feature will be useful to my target audience. I drew out personas from my real-world experience. A working mother of two children, who has issues with the improper waste management in Bangalore was the person I sought to design for at the end. Waste management is a huge problem and solving this requires one to address other branches of this issue. One of the main struggles, during the project, was to define the scope of the project. I felt I had too many ideas to add to the application and towards the end, I realized how confusing it would be for a user if they are offered with plenty of features. Another thing I struggled with was the transformation from a prospective user to the designer of the product. Having grown up facing the issues, I was trying to address. Initially, I considered my needs into the picture. Through the course of the project, I realized "The User is not you."

Impact

On looking at my designs, one of my roommates commented: "People don't view waste that way India they care less about their environment and such behavior won't change, are you sure this can be implemented there?". Well, I suppose the idea I have is too far-fetched but the idea to bring about change. I want to change the societal norm of "not caring about what you do" be it the food you eat, the waste you generate. One must realize that their actions have a consequence. People must think of the bigger picture not just of their families and household but their environment too. This is the change I plan to bring about so that our future generation can walk in clean streets and eco-friendly neighborhoods.

The societal norm my application utilizes to bring about this change is "competition through active comparison". We all have grown up with our parents comparing us to their friend's children. Yes, such sort of comparison is wrong as it degrades the concept of uniqueness, but, if you think back, somewhere down the line, such comparison motivates us to strive harder and become a better version of ourselves. I hope such an application brings about this change.