Project 1

E-Recycle

Update your knowledge about ‘whats’ and ‘hows’ of recycling anything

Abstract

There is a complex and frustrating reality to recycling. It is the third and most recognizable among the ‘Three Rs’- Reuse, Reduce, and Recycle. Findings from Recycle across America show that “According to a recent Yale University/EPA study, the U.S. recycles less than 22% of its discarded materials. The U.S. recycling levels have not improved in 20 years despite the billions of dollars spent on recycling competitions, symposiums, awareness campaigns, and new sorting technologies. Despite only representing 5% of the world population, the U.S. generates more waste

1.) Source EPA: https://www.epa.gov/recycle/recycling-basics

than any other country in the world[1]. (WorldWatch Institute) In less than 15 years, worldwide waste is expected to double. (WorldWatch Institute) One fact remains - if the public is confused when they approach the recycling bin, they will continue to: make mistakes, be apathetic and be skeptical about recycling - and therefore, contamination levels will continue to be high, recycling will continue to be economically crippled, recycling levels will not increase and environmental progress will be stalled. In the state of California (a state known for its progressive recycling), more than 1,000 recycling plants have shut down since 2018".[1]

There are non-profit society-wide standardized labels for bins that are one of the top solutions to help people recycle properly. The standardized labels are proven to increase recycling levels by 50-400%.[2] However, with increasing technology used it only helps to have educational applications on our phones that tell us what to recycle and how to recycle. It is critical to understand that recycling is in crisis and it can be avoided if one understands several cited reasons, findings from recycle across america shows that “the collapse of recycling is primarily due to high contamination levels in the recycling stream. Contamination is trash or dirty recyclables in the recycling stream, and it cripples the economics of recycling.” Removing contamination reduces profitability, driving up the cost of recyclables, thereby preventing many manufacturers from reusing recycled materials. As a result, they continue to deplete finite natural resources at alarming levels. Contamination is a direct result of millions of inconsistent and confusing labels on recycling bins throughout society, confusion about what is recyclable at a given bin, and the lack of basic knowledge on how to recycle.[3]

E- Recycle is a conscious step towards sustainable livelihood. It is an educational application that teaches us how to recycle the things that we come across in our daily lives.

1) Source: https://www.recycleacrossamerica.org/the-recycling-crisis 2,3) Read more here: https://www.recycleacrossamerica.org/recycling-facts

It tells you the basics of recycling and how you are supposed to divide things you wish to discard into different subcategories of recyclables and throw it into the right bin. It can help you recycle cups, your daily takeouts and packaging, and even more.

Keywords

Sustainable livelihood, Recycle, Reduce, Reuse, Waste management, Educational

Introduction

We are paying a very high price for the confusion around recycling because most of the recyclables end up in dumps and then it gets very difficult to collect them from landfills to recycle and reuse. Often most of it has to be discarded and it never reaches for recycling. To tackle this challenge, we can help educate people at the very first step when it comes to putting the right recyclables into the bin. E- Recycle helps you understand how you can consciously live a sustainable livelihood by learning just the basics of recycling. It helps you understand what parts of your packaging or a takeout you buy in your daily lives can be put recycle the right way. Tackling a problem from the root can go a long way. We can even help avoid the recycling industry from collapsing. There are so many myths around the recycling crisis like people do not care, people do care and the fact that recycling is so poorly communicated to the public and that the importance of recycling is so underplayed often leads people to feel subliminal, or even overtly, that it must not be very important.[1] E-Recycle can help you with educating yourself on the right communication and ways to recycle.

1) Source: https://www.recycleacrossamerica.org/the-recycling-crisis 2) Read more here: https://www.recycleacrossamerica.org/recycling-facts

Statement of Design Problem

We did a quick survey to understand people's knowledge and curiosity around recycling through this form[1] and we found most of them want to learn to recycle better but they are often confused or feel it's tedious often to even find recycle bins. The main problem here is that people have less knowledge about recycling, recyclable materials, and their accessibility. We also came to know that just by taking the first step that one needs to recycle we can surpass a big possibility of a crisis in the recycling industry. Furthermore, we need to learn about the common recyclables and how one identifies that. Going to a bin all confused about what to put where is something very common among us all. Even if we find a bin, putting efforts to divide your items into trash, compost, or recycle bin can be a tedious task. Only if one is curious enough and cares to learn more about it, can we walk towards sustainable livelihood better.

Design Methodology and Process

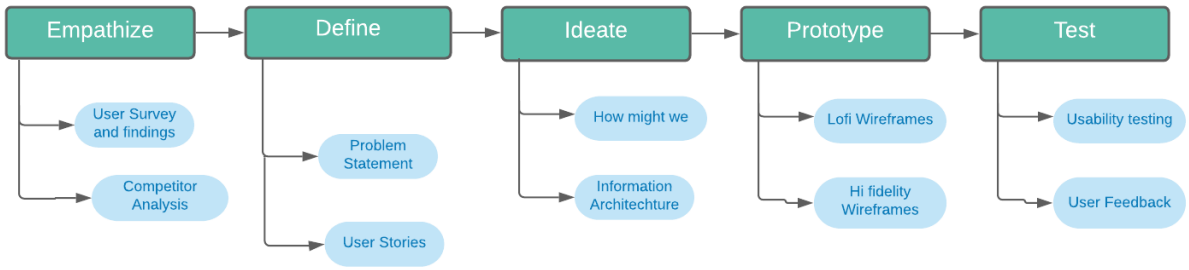
We followed the design thinking methodology for the project. We applied critical and creative thinking to understand, visualize, and describe complex, ill-structured problems and develop approaches to solve them. In this methodology the primary focus is generally on the problem and product, the model does use customer feedback for solving ill-structured problems. To understand it better we conducted a quick survey to see how curious people are to understand their recyclables and learn more using an application. Design thinking encompasses processes such as context analysis, problem finding and framing, ideation and solution generating, creative thinking, sketching and drawing, modeling and prototyping, testing and evaluating.[1]

"Core features of design thinking include the abilities to:

- resolve ill-defined problems
- adopt solution-focused strategies

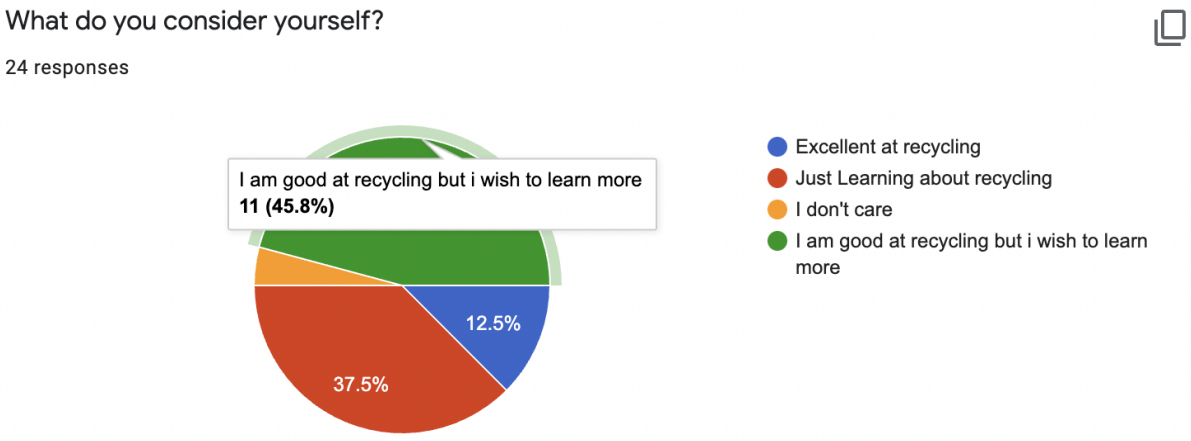
1) Source: https://en.wikipedia.org/wiki/Design_thinking

- use abductive and productive reasoning
- employ non-verbal, graphic/spatial modeling media, for example, sketching and prototyping".[1]



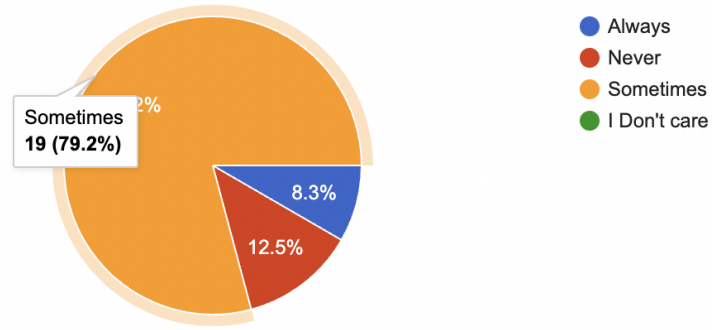
Empathize and Define:

As a part of the process, we did a quick survey among our friends and family to understand their curiosity and willingness to learn about recyclables. And here are some findings from the survey:



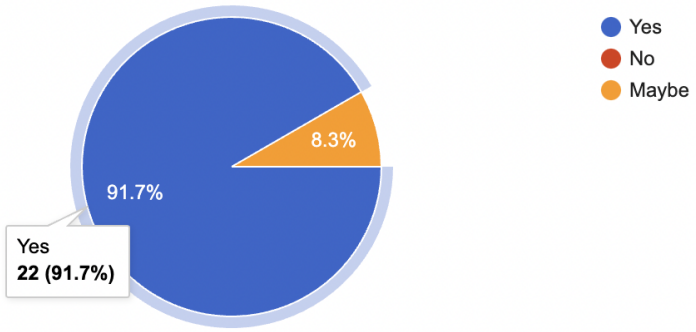
How often do you get confused while standing in front of the recycle bin?

24 responses



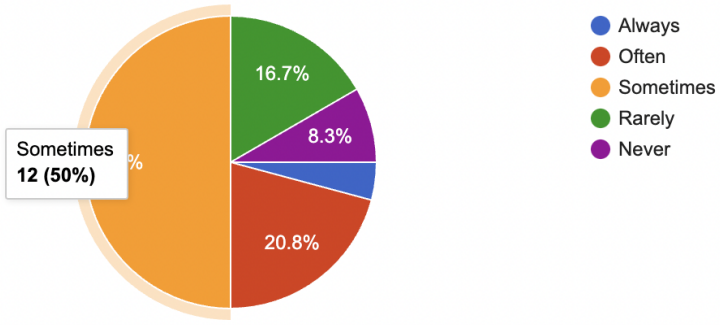
Would you change your recycling behavior if you knew better?

24 responses



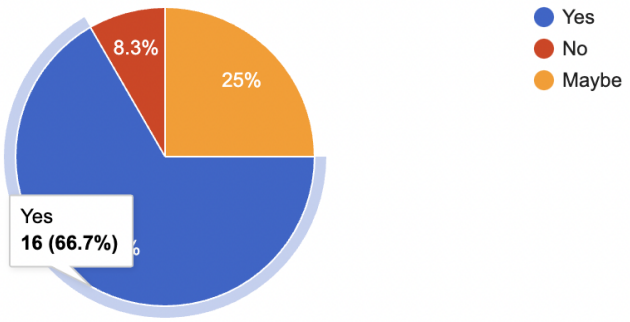
How often do you search for signs of 'recycle' on a packaging and understand it?

24 responses



If given an application in your mobile, that teaches you how to recycle, would you use it?

24 responses

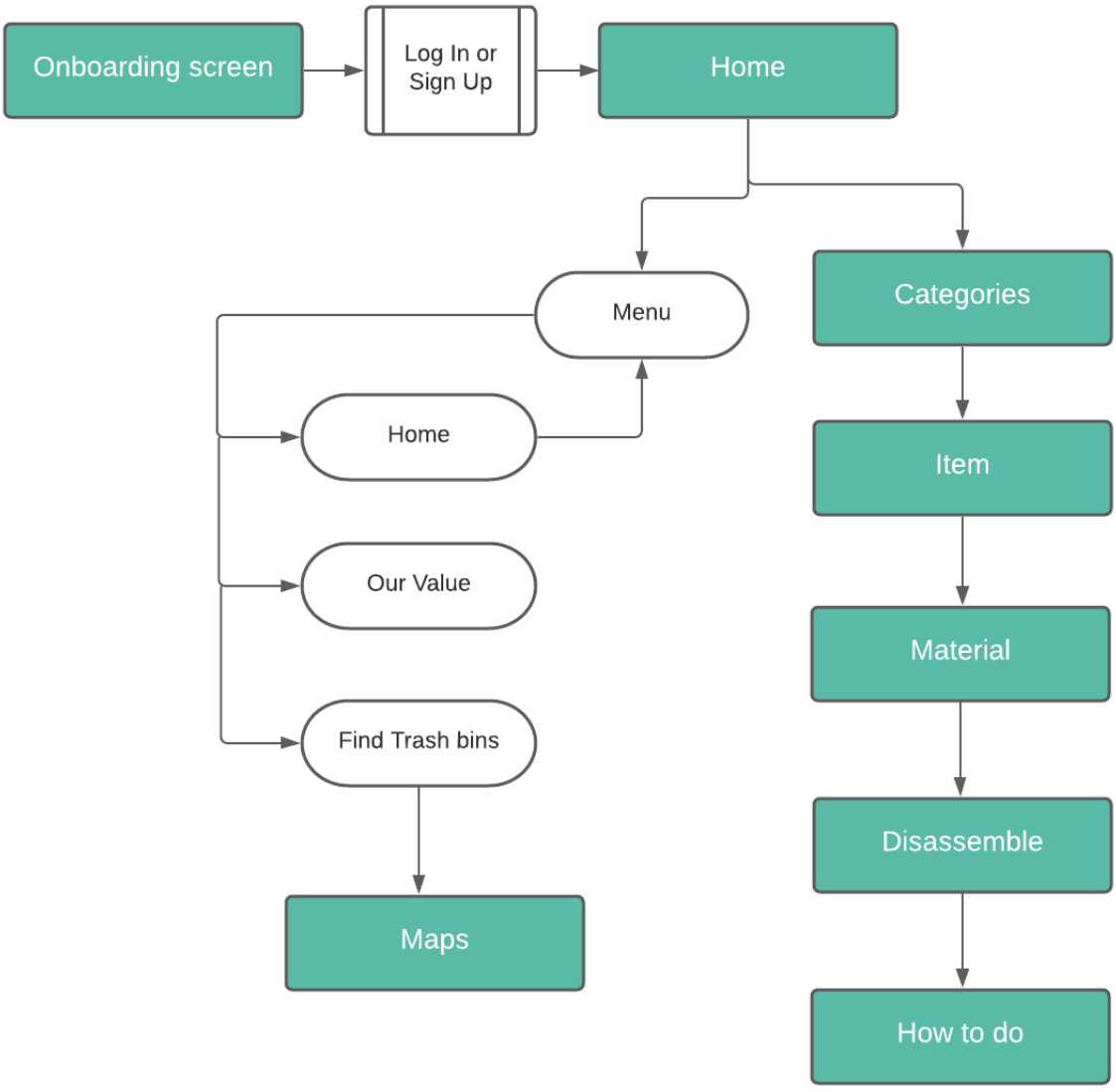


Gantt Chart:

Ideating

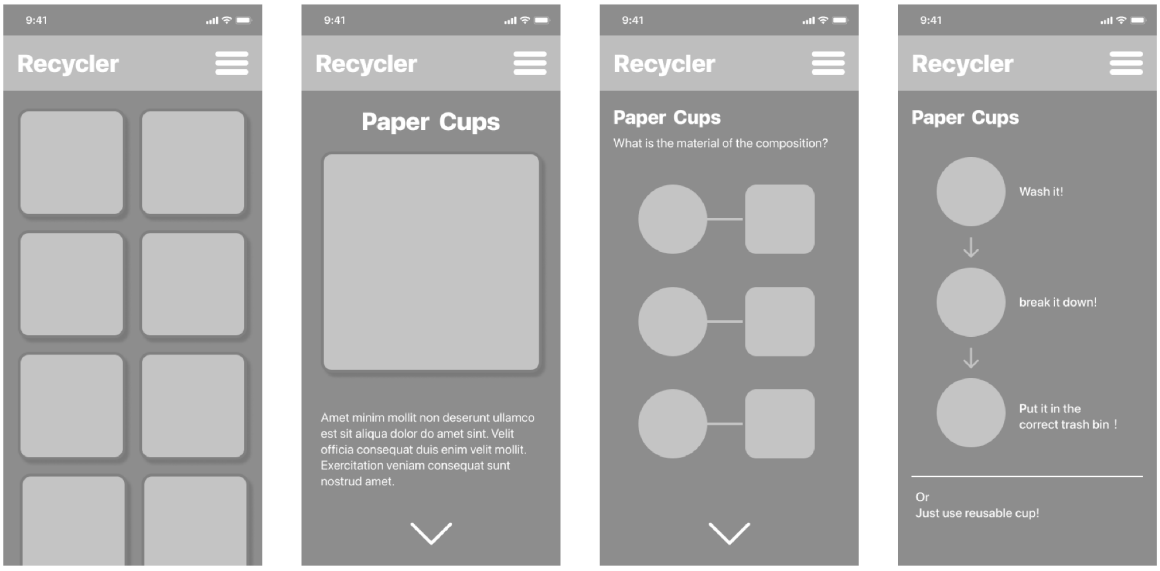
We followed the HMW (How might we) process to come up with the challenges we need to tackle here. It helped us keep a track of all the pain points like can we make recycling an easy process, and how can we deal with the confusion around recycling and help towards sustainability.

Information architecture:



Wireframing and prototyping:

Low Fidelity wireframes:



Functional Testing

To understand if the application was successful in terms of our predetermined flow, we did the functionality testing in our group of friends. We tested with three different people and they were all able to do the intended task. The navigation from the categories screen on the home screen to the final screen was achieved easily.

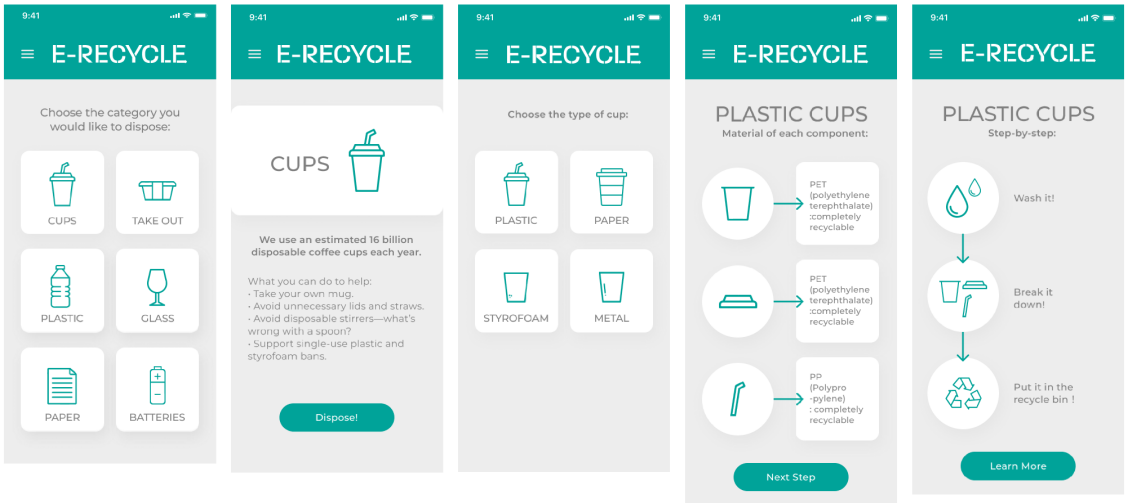
To give more context we gave a background and intention of our application and what is our intention in building the application. We explained how confusion around recycling has led most of the recyclables into the landfills which makes the reusability of it at stake and generates so much waste. After showing some statistics and explaining the intention we asked them to try the hi-fidelity prototype and saw that having clear call to action buttons helped make the navigation much easier. All the three friends agreed that while throwing a packaging or a plastic cup they are often confused on which bin to throw it in, and this application has a great potential to educate people. Furthermore, they appreciated the overall color palette used and were happy with it.

Some of them did suggest that in the future scope of this application we can have collaborated with some recycling companies and we could add QR codes on recyclable things and use that as an incentive.

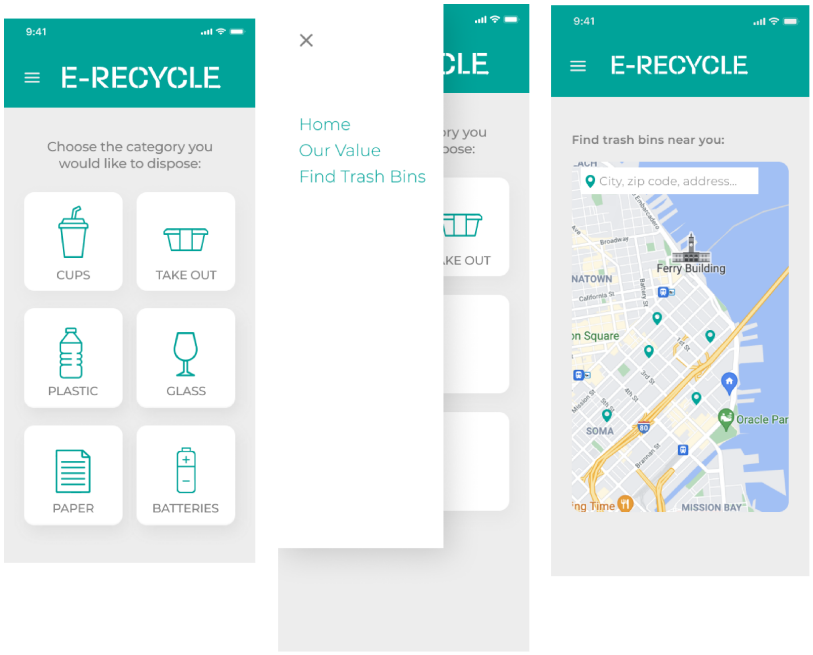
Final Prototype

For the final prototype, we researched around so select a color palette and found that this color palette defines the idea and background of it very well. We also went through a couple of ideas on the name and one of our teammates designed the logo from scratch and then visually put all the screens together.

Flow1: Home → Categories → Item → Material → Disassemble → How to do



Flow2: Home➔ Menu ➔ Map



We tried to achieve pixel perfection in the final prototype and design on Figma so that the development would have the right data points and clear values on the frame. The final prototype is developed on P5.js using the IDE Atom. We had various pain points to cover and challenges to achieve when it came to the final developed prototype. The team effort really helped us achieve all the areas aptly.

Envisioned User Experience

The final prototype gave us a good idea of how it will be envisioned among end-users. It gained instant attention and the whole brand color and having a proper logo in the final prototype and all the navigating screens made the experience so much better. We did the testing on people who took our earlier survey so they had an idea of the background and the idea behind the application. We saw that in later screens the user was trying to go to the next part and a good and clear CTA helped achieve the satisfaction around navigation which was interesting to observe. However the last

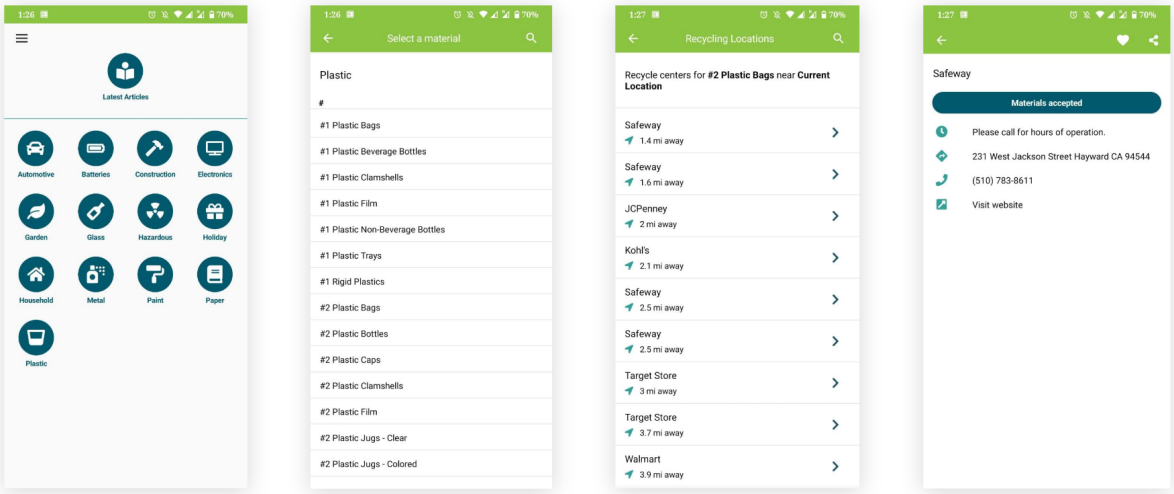
screen did create confusion around taking the user back to the home screen. The team decided to put a future scope to it and have more screens that help the user to learn further about the process and type of material they are recycling.

Prior Art Examples

We tried finding applications that helped educate people about recycling. And we found that there are a couple of them that might not tell you exactly the process of recycling but they will help you find the nearest recycling station or a bin where one can drop off the recyclables. They had even more aware categories of recyclables.

Example 1:

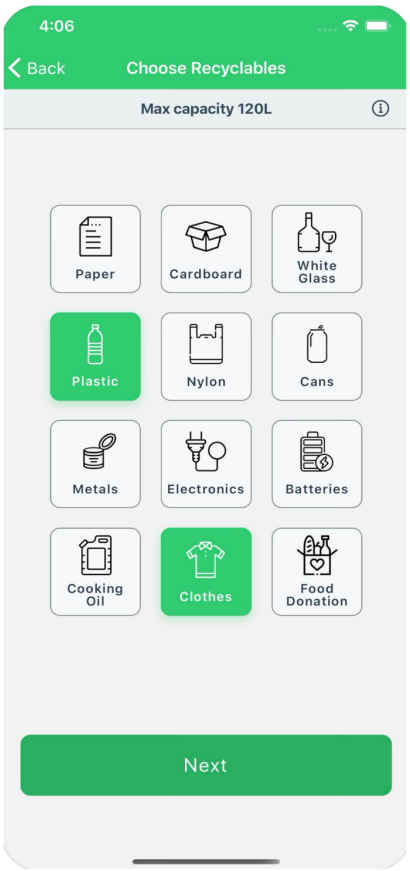
iRecycle: Available on play store and apple store. It helps sort the recyclables in U.S. It provides location, Telephone number, and more than 110,000 recycling programs at 250,000+ Locations.

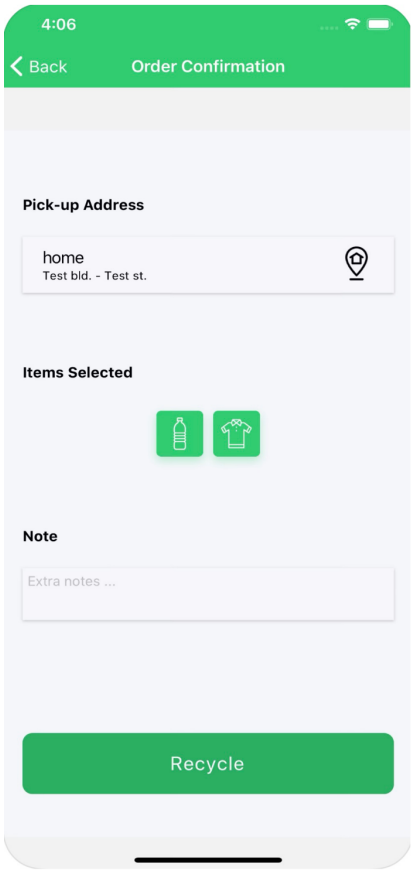


Example 2:

Live Love Recycle: In the app, it shows many different recyclables in the chart, the pick-up address, and the items that you select to recycle.

The interface of this app is very intuitive, making it very easy for us to select the items we want to recycle when using it. Moreover, the simple icon indicates that each item of recycling and the color feedback after selection are we can learn from it.





Findings

We found that recycling confusion is a much bigger problem in the U.S. and outside and it has led to the closing of various recycling centers and industries and also increased so many recyclables ending up in landfills and going to waste. To our knowledge inconsistent labels on

bins are causing public confusion about recycling and resulting in millions of tons of garbage being thrown in recycling bins. Garbage thrown in recycling bins is causing a crisis for recycling in the U.S.

Various statistics show [1] that the rates of recycling have been falling evidently. We believe this application has a really good scope in helping educate people to recycle and also increase these rates.

Our Findings through the survey done for the project and usage of the application:

- 45.8% of the survey respondents think they are good at recycling but they wish to learn more about it and 37.5% think they are just learning about it. Only 12% of them considered themselves excellent at recycling.
- On asking if they would change there if they knew better, 91.7% of them responded yes.
- About using such an application from their phone that teaches them to recycle, 66.7% said yes and 25% maybe.
- Users would like to have some incentive to use the application like every time they recycle and they get points.

Next Steps

If we had more time to think through we could also have included various other items that could help users to learn more about recycling, there could be blogs and the latest government policies and news around recycling in the area. A scanner could also be included that scans the label on the packaging to tell you enough information about the recycling of the material. There could also be a purchase section where people could easily purchase the recycled items and reuse too. A scope of adding some incentive around using the application could be a good idea.

Conclusion

To conclude, we enjoyed the process of brainstorming as a team, and collaborating with teammates who are from different countries was a great experience in terms of this project. Though we did a quick survey and read a bit around the problem statement, we could have

done a better job at understanding the categories of recyclables and also defining various target audiences from various age groups. However, we were able to achieve the main flow and we feel grateful for the learnings. It would be a great idea to take this forward because there are not a lot of applications trying to achieve this and it has a great scope to it.

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home | p5.js. (2014). P5. https://p5js.org/

Credits:

1. REI report from EPA
2. Recycle across America organizations for helping normalize labels on packaging
3. Tools: Figma, Google docs, Notion, Atom, Slack, Google slides, Adobe suite, Lucid