University of Regina | Faculty of Engineering and Applied Science

Project Report

Project Group: Team Lore

Submitted By: Brydon Hearuf

Student No: 200454546

Submitted By: Jasmeet Singh

Student No: 200405262

Submitted By: Yi Xu

Student No: 200457644

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Table of Contents

1.0 Intro **3**

2.0 The Process **3**

2.1 Project Planning 3

2.2 Prototyping 4

2.3 User Feedback 5

2.4 Constructing the App 6

2.5 Final Outcome 6

3.0 Reflection **7**

3.1 Overcoming Obstacles 9

4.0 Conclusion **10**

Table of Figures

Figure 1 **4**

Figure 2 **5**

Figure 3 **5**

Figure 4 **5**

Figure 5 **6**

Figure 6 **6**

Figure 7 **7**

Figure 8 **7**

1.0 Intro

Recycling is extremely necessary for the success of our species moving forward. Without it, waste buildup would get out of control and result in an inhabitable planet for us. By recycling, we are helping to eliminate this risk, while contributing to other issues such as pollution in general, and climate change. Without a healthy planet, we have no future. For this reason, our group sees this project as an opportunity to do something worthwhile. Our idea is an app for recycling which identifies whether or not a certain item can be recycled, with information on how and where you could do that. We accomplished this using a series of documents and processes that helped us map out ideas and plan its development. Ultimately the reason "why" we have chosen this idea, is to raise awareness and do something about the urgent global issues we are facing. Doing something worthwhile, and growing as software engineers at the same time, is truly an opportunity we could not refuse.

2.0 The Process

2.1 Project Planning

Our team's project planning began early in October where the team gathered around and brainstormed on how we could make an impact in society. It was a fairly easy decision for us as a team to agree upon a recycling project as contributing towards society in terms of having a clean and friendly environment is something important to us. The first bit of the planning was to assign the team members with roles which would allow us to work effectively throughout the project. Next, we explored several documents that allowed us to outline our ideas and answer questions about our project we had not even thought of. Moreover, it is very important for any team to have an overall mind map when planning a project, hence the reason we decided to use a Gantt chart which would summarize the timeline of the entire project (Figure 1).

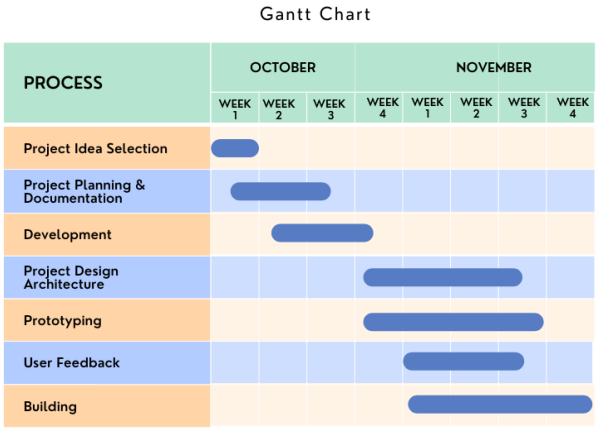

Figure 1

After initial planning, we started diagramming where we went to the drawing board and explored quite a few ideas using various templates. These included sequence, class, MVC architecture, and data flow diagrams. We also explored use case diagrams to create a clear vision of what the key tasks for users and admins would be. Overall, the project planning stage included a lot of new documentation for us, and allowed us to define a direction for the future.

2.2 Prototyping

We decided to create a Hi-Fi prototype opposed to a Lo-Fi prototype because we wanted to give preference to our user experience. In the end it is the user who will be using the product, so by implementing a Hi-Fi prototype, we could give it to our test audience for our user feedback. In the design, when users enter our homepage, they will see a search bar where they can search something they want to see on the results page. The results page includes the item image, the short description about item information, and GPS pinpointing feature which shows the nearest recycling center and related information. If users want to contribute to our recyclable database, they can create an account and log in to add an item. After providing the item name, manufacturer and some other information, the user can simply click submit for the item to join the database. Users can also check the status of their email address, contributed posts number and browse history. See figures 2-4 for example pages in our prototype.

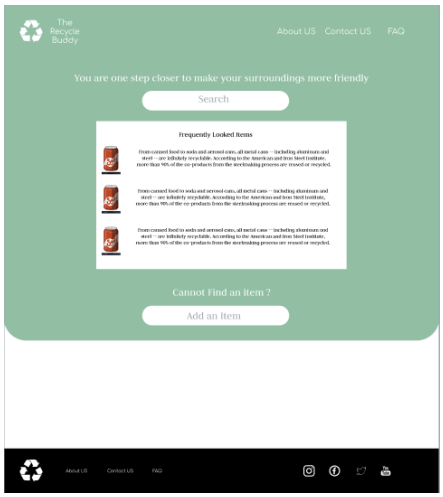

Figure 2

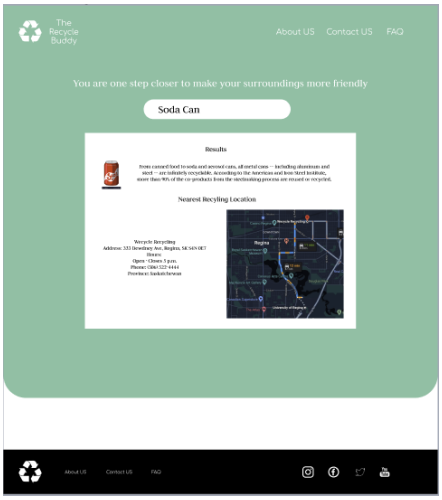

Figure 3

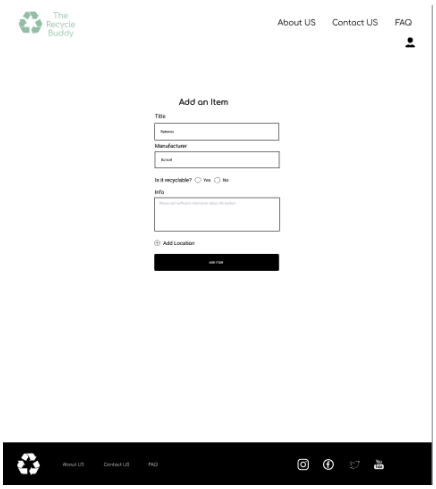

Figure 4

2.3 User Feedback

User feedback is an important section for us to examine and improve our design from user's perspectives that can be sometimes ignored. We received precious feedback for our vlogs and prototype from a group of our peers. As our Hi-Fi prototype is created with a green background for most pages, part of the feedback indicates that it would be better to change the background color to white and adjust other elements. They also suggested the green color would look nicer if it was a little bit darker. So we followed that with changing background color, recoloring our logo and making adjustments to other elements. As a result, the user interface looked much cleaner. Another useful feedback described that a user account status button should be added on the navigation bar for users to log in or log out quickly. We added this function to our design as it was mandatory for users and improved their experience. Special thanks to our professor, team leader and team sponsor Tim who gave us a lot of advice throughout the whole project. After the scrum presentation, he recommended that we move the location features to future MVPs. In fact, we did not have much time to implement these functions, so the GPS pinpointing features have been moved to MVP 3. We are glad to see our project acknowledged by our peers, and we could not have made our app the way it turned out without the valuable feedback we received.

2.4 Constructing the App

Once we had mapped out exactly what we wanted to do with this project in the documentation phase, it was time for development. The Recycle Buddy was created using Node.js, Express.js, EJS, MongoDB, HTML, CSS, Bootstrap, and Passport. Initially, we planned on creating an API, where our vanilla JavaScript frontend would fetch from. However, there were some concerns whether or not this would cause us issues in the long run, so we scrapped it and refactored using the stack mentioned above.

The backend is composed of several routes correlating to various functionalities of our app. It connects to a local MongoDB database, and stores the database in a json file, so users on other computers can access the same information. This is an extremely flawed design for a number of reasons, but it suited this project as it was familiar and cost-free. The frontend was created using basic HTML and CSS, with Bootstrap for some components. We also utilized EJS to easily populate pages with dynamic data, and abstract logic where applicable. Overall, the development process was smooth, and allowed us to refine our skills while creating something we were proud of.

2.5 Final Outcome

After planning, diagramming, prototyping, and constructing the app, we were left with a minimum viable product version of our application that we were satisfied with. This MVP includes functionality that allows users to search for and view recycling information on an item they are looking for (See figures 5-6).

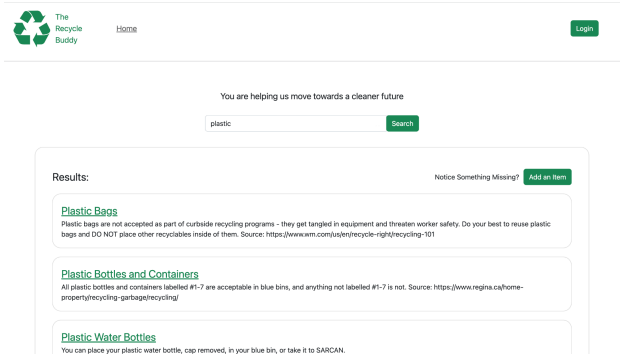

Figure 5

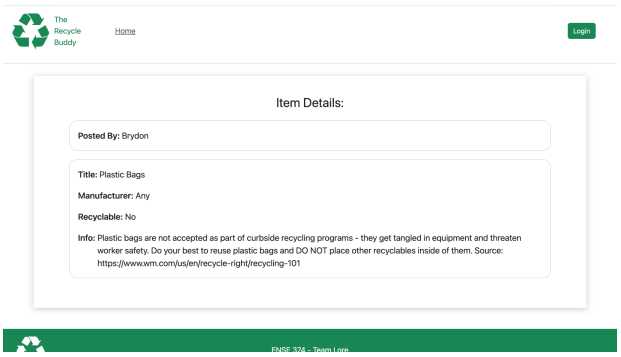

Figure 6

It also enables users to signup, login, and add items to the database themselves. Users are also able to edit their previous postings to correct any errors. This feature allows for a continuous flow of new information being added to the site. Future MVPs look to add measures that would ensure/encourage accurate information being added (See figures 7-8).

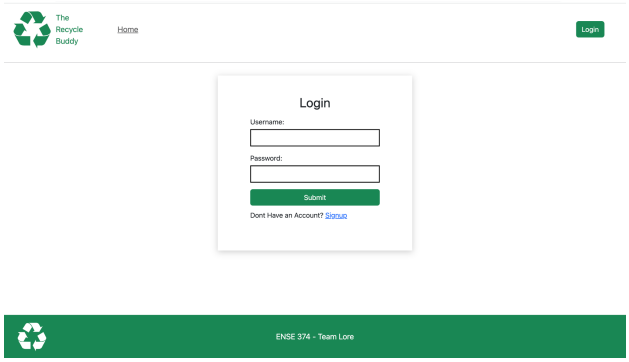

Figure 7

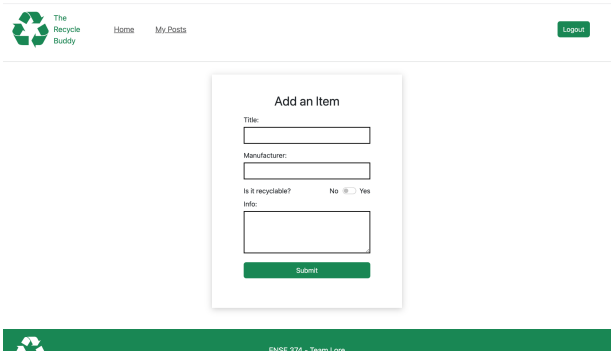

Figure 8

3.0 Reflection

Overall, this project was a great experience for our team. It allowed us to develop in both technical and non-technical ways. We believe our team was very successful, since as strangers, we were able to form an effective and well communicating group. We also delivered an MVP we are proud of, with strong documentation supporting it. We enjoyed seeing a software development project from start to finish, and learned a lot along the way. Exploring new types of documentation and other processes was a great opportunity for us. We also liked that this project pushed us out of our comfort zones in various regards, including the final presentation, vlogs, and strict deadlines. We feel mostly positive about this project, but one thing we disliked was repetition in certain documents, and some which felt unnecessary (specifically stakeholder related documentation). That being said, we recognize that on larger scale projects this can be more helpful, and are still happy to have learned it.

There are many things for us to be proud of, but a few are especially worth mentioning. Firstly, our ability to produce high quality work as a team, while working mostly individually was commendable. Our communication was fantastic throughout the process, and work was

completed on time, without missing any requirements. Ultimately, this resulted in a well prepared presentation, and smooth running application.

Working with a team on a project this significant would inevitably teach us some things about ourselves. Above anything else, it emphasized the importance of communication in this industry. This reiterates to us the 80% people 20% technology aspect of software engineering. We learned that we all had different strengths and how to utilize those for maximum output. Here is some individual feedback from each of our members:

“My biggest takeaway from this project is that sometimes it is best to just focus on my own tasks and trust my teammates with theirs. Often in group projects I find myself overseeing the work others have done, which not only consumes my time, but can weaken trust within the group. This term, my group members were excellent, and by trusting them to produce high quality work, I was able to build better relationships with them and have more fun with the project” (Brydon Herauf).

“This project without a doubt was an amazing experience for me. I got to work with one of the best teammates I could ever work with. We really understood each other’s strengths and allowed us to nourish ourselves as better software engineers. In terms of technicality I personally learned the proper aspects of documentation, teaching me that a piece of document is as important as the final project as it is every step that fulfills the role of having an outstanding project” (Jasmeet Singh).

“What I learned in this collaborative project is that a team works well with experienced developers who also act like leaders. I still remember every time we are going to work on a new activity, Jasmeet will make a Google Doc and list requirements there for us to have a clear understanding of what to do. Brydon will contribute many brilliant ideas which makes me inspired. It is pleasant to work with them, and I am motivated to enhance my skills so I can become an excellent developer in the not too distant future” (Yi Xu).

This project taught us a series of technical and non-technical skills. We learned how to use a ton of documentation and processes, some of which we will certainly use again. Specifically, we enjoyed using kanban boards, and mapping out our MVPs to stay on top of

everything at all times. There are some documents and diagrams, which are perhaps more situational, and may not be used in every project we do in the future. On top of technical skills, the interpersonal and professional skills we picked will certainly help us thrive in any environment.

The area where we could use some guidance is in using certain processes for future projects. Our initial MVP was far too optimistic, and we ended up needing to cut out a lot of features. I think experience will serve us well in this regard, but we could use more help in estimating how much work we can realistically get done given our situations. Also, determining which diagrams and documents are necessary and which to prioritize for certain projects is an area we would like to improve in. Again, with experience we will figure this out naturally, but any guidelines in this context would also be beneficial.

3.1 Overcoming Obstacles

While there were many high points in this project, it came with its fair share of obstacles as well. Balancing many classes and other responsibilities is always a challenge, and our team often pushed project work until the last couple days before submission. However, even after setting ourselves up for disaster, our focus and perseverance allowed us to overcome this consistently. A specific example is when due to certain circumstances, our group was not able to work on project deliverables over the reading week at all. Despite this, we were able to come together and create something presentable for our scrum. Another obstacle worth mentioning is the project refactoring we did halfway through development. After some critical thinking, we determined that the technologies we were planning to use could result in some serious roadblocks towards the end of development. Ultimately, we decided to cut our losses and refactor the project to use the techstack taught in the courses' lab. This ended up being a great decision, as the rest of the development process was smooth and successful. Our group faced many obstacles throughout this project, but we continued to move forward, and found success in the end.

4.0 Conclusion

Our goal with this project was to create something worthwhile, while developing as software engineers. We can proudly say we accomplished both of these. The Recycle Buddy is a platform that facilitates positive change and encourages a process essential for growth as a society. While there were many hills and valleys, our team was ultimately able to push through and complete all required deliverables with satisfactory quality. During this project, we were able to pick up new skills and gain experience with various software processes. This, along with learning how to work on a software project as a team will certainly have a positive influence on the engineers we become.