

Zero-Waste Pennsylvania Waste Audit Application

Executive Summary

Community Partner

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Background

Pennsylvania Resources Council, PRC, is the oldest grassroots environmental nonprofit in Pennsylvania. In the words of PRC, their mission is: “*To lead and promote individual and collective actions to preserve Pennsylvania’s environmental resources for each generation.*” Their main solution to address these problems is educating Pennsylvanians in school classrooms and through adult classes so that people can learn about their environmental impacts and spark the desire to better manage their resources. PRC works alongside communities to create education programs and host a variety of waste management events.

Project Description

Project Opportunity

The greatest impediment to ZWPA’s current waste audit process is its dependency on pen and paper. This proves to be cumbersome for employees in the field who must account for various paper forms. Exacerbating this is the necessity of documentation during walkthroughs. That is, waste auditors often augment forms with additional notes and images to support their reports. Additionally, moving from physical to digital report generation lacks efficiency, as considerable effort is expended on manual data entry. Re-engineering and enhancing the technology surrounding the waste audit process would add considerable value to the organization, as ZWPA stands to gain both time and revenue from facilitating its fee-based services. Additionally, a faster turnaround in ZWPA reports and audits could encourage client interaction. Also, features like instant graphs and reports can save a lot of time.

Project Vision

Our vision was to implement a web application to facilitate data entry, management, analysis and storage in regards to the waste auditing process. We aimed to expedite the initial questionnaire stage by enabling a web option that allows ZWPA staff members to quickly complete necessary fields. Additionally, we aimed to allow ZWPA auditors to quickly and digitally complete waste audit forms. Audit information could then be downloaded and instant analysis will be provided by the application.

Project Outcomes

The solution involved an online tool to make it easy for the client to enter data onsite while performing the waste audit, present the raw data in a meaningful manner and perform some basic analysis of the waste information collected. The online tool is mobile responsive and allows the user to do the audit related tasks such as taking pictures and notes on the application itself. Thus there will be no dependency on other mediums. The platform also allows the user to export the data for further detailed analysis. We also made the tool secure, so that the data is well protected and not exploited. Additionally, we made the application customizable depending on the type of the audit and fit the flow of the application to the client's mental model. The clients, after doing a test runs, think that the application will expedite the audit process.

Project Deliverables

1. A 100% tested application that provides data collection/export tools and automatic data analysis/graph generation.
2. Set up/deployed application on a Digital Ocean server.
3. Technical documentation for future developers. This includes our ERD design, model/controller documentation, explanation of specific design choices.
4. Video tutorials for our clients on how to use the specific features of our application.

Recommendations

It's important to focus on sustainability and the quality of the solution. Thus, we spent a significant amount of time ensuring that we set up the application in way that's scalable (for example can be extended as an API) and fully tested. We also wrote extensive technical documentation for the future developers who might work on the platform. This way, our solution can be sustained and changed if requirements change in the future.

Moving forward, PRC can expand this application to involve other processes that other departments within perform so that the organization can have a centralized data source. This can be done by making an API for the backend.

Student Development Team

Vinitha Ranganeni served as Project Manager and Back-End Development Lead. She is a third-year student majoring in Information Systems. She will be interning at Aurora Innovation this summer and will begin her PhD in Computer Science at the University of Washington, Seattle this fall.

Jonathan Wihl served as Design and Front-End Development Lead for the team. He is a third-year student majoring in Information Systems. This summer he will be working with a research team at Harvard University.

Arnav Gupta served as Full-Stack Developer for the team. He is a third-year student majoring in Information Systems and minoring in Human Computer Interaction. This summer he will be interning in Microsoft, with the Microsoft Flow team as a software engineer intern.