

Tangible Waste

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Abstract

Education lies at the roots of “Tangible Waste”. With the scientific goal to translate data into an interactive installation, the audience will be encouraged to emerge themselves into the project. Focusing on the ever present and popular issue of wastes and the outstanding rates and mechanisms at which it is “eliminated”, we will present disposal trends. An element of storytelling will complement the data in order to encourage user participation in the “zero waste” movement - an important part of the critical climate change reversal plan. We found this project produced a higher interest rate from our peers, who were more likely to view all of the graphs and pay attention closely to follow up information and storytelling.

1.Introduction

“Tangible Waste” focused on the importance of two particular subjects of the Zero-Waste Movement, as well as the alienating effect that large datasets can sometimes present towards an audience.

Commonly, data does not appear attractive enough to entice non-data personas. Sometimes the “scientific” look of elements is intimidating, and personalities shy away from immersing themselves in data related projects, as they believe they cannot hold themselves to the intellectual standard. This stigma that data presents towards an audience develops its own instances of “othering”, in which audience members isolate themselves from big data science, dismissing their potential abilities to understand complex topics.

The goal of “Tangible Waste” is to make this standard invisible. Through elements of tangible play and exploration, users will find themselves more interested, willing to learn more, and walk away remembering more. Ultimately, the goal of visualizations should be to educate and communicate information above all, and that cannot be achieved if a visualization is difficult to comprehend. We first collected information on current recycling trends as well as other issues surrounding waste and trash pollution, then we collected statistics about how trash affects the ocean and other sustainable alternatives.

2.Related work

We first came across an article posted by National Geographic, *A whopping 91% of plastic isn't recycled*, which did an amazing job of bringing to light the importance of this topic and highlighted the fact that something needs to be done now [3]. So we then wanted to do more research into recycling, which then led us to the article *Containers and Packaging: Product-Specific Data* written by the United States Environmental Protection Agency (EPA) which went into depth about the different recyclable products and respective materials [2]. The EPA collected data on things like recycled plastic, aluminum, wood, paper and paperboard, glass, steel, and much more from 1960 to 2017. Our next question was to also just look at the overall health of our planet to consider if factors like global warming were topics we wanted to include. We found a large dataset posted to Kaggle by Berkeley Earth that included the date, city, state, country, and average temperature [4]. They also posted this graph:

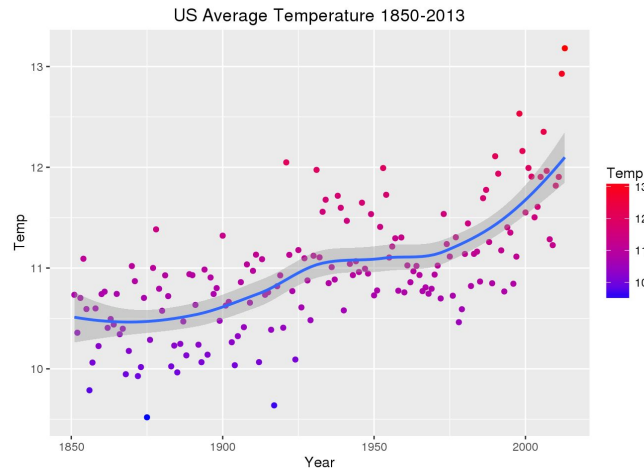


Figure 1: US average temperature [4]

Which helped back our belief that global temperatures are rising, global warming is in fact true, and we as a society need to take action to help prolong the life of our earth. We then decided to focus on teaching and promoting ways to improve the health of our earth by doing research on recycling, rather than trying to prove what the graph above already shows (which is that in fact the earth is getting hot). We decided to focus on visualizing the recycling data from EPA to show the trends over time.

We also each decided to focus on other specific sub topics to visualize:

For Paige's visualization, she decided to focus on the negative effects of waste in our oceans. Although most landforms on the globe is taking a hit from global warming and the effects of waste, the oceans typically take the hardest blow, as it is an easy deposit for waste so it becomes out of sight and out of mind. For her infographic she also decided to focus on telling a compelling story to kids, in hopes that it could start good habits to continue into their adult life. The first research she conducted was from the website seeturtles.org, which mainly focuses on how trash affects sea turtles but it also includes lots of useful information about other sea life [6]. She was mainly focusing on teaching about the effects on animals in the belief that it would be more compelling to kids. She then found an article from Rubicon that put facts about waste into perspectives like the fact that "18 billion pounds of plastic trash winds up in our oceans each year" [8]. To put that in perspective, it's enough trash to cover every foot of coastline around the world with five full trash bags of plastic....compounding every year". By putting information like 18 billion pounds into a more understandable terms like how it could cover the coastline makes it easier to interpret for a wider audience.

Julia focused on broadening people's perspectives of what is and is not recyclable, as well as other misconceptions about recyclables and sustainable alternatives. She did research and found an article from the Center for Biological Diversity which highlighted the issues surrounding the use of plastic bags and their effects, she later used this information in her infographic [9]. Her next area of research was concerning the use of plastic, and the ways in which we can cut down the use of plastic silverware. She found an article posted by National Geographic which uncovered how we are currently living in a "throw away" culture, which greatly impacts the amount of waste we produce everyday [7]. They also incorporated lots of creative compelling infographics like the figure below, which also demonstrates our initiative of teaching through different interactive ways:

The National Geographic article also brought to light another important question; how many times can we really recycle? An article written by Our Auckland researches how many times certial articles can truly be recycled

till they are unuseable. For example, most people do not know that plastic can only really be recycled 7-9 times before

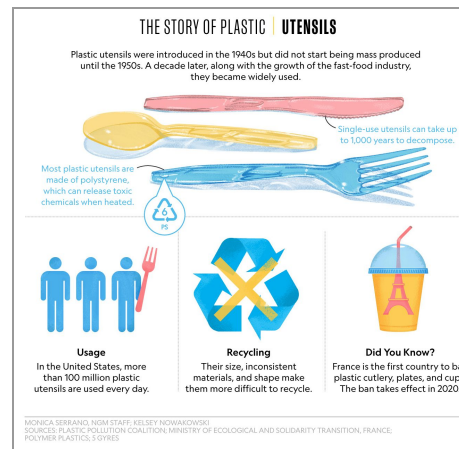


Figure 2: The story of plastic [5]

it is no longer recyclable [5]. We used information like this to encourage people to look for zero waste alternatives like bar soap.

3. Project Description and Justification

After familiarizing ourselves with a segment from Harvard Business Review regarding effective data visualizations, we were certain interactivity was essential to the design of our project. It is common for visualizations to embody *convenience*, which “is a tempting replacement for good, but it will lead to charts that are merely adequate or, worse, ineffective” [1]. Where these visualizations tend to fail, is that they do not “capture an idea”. These graphs seem to be created as supplementary visualization for information that feels intranslatable to the general public. We tried to embrace the idea that we were “showing a reflection of human activity, of things people did to make a line goes up and down” [1]. In this particular case, we utilized interactive storytelling elements to bridge the gap that exists between data visualizations and their backstories.

We wanted to approach this carefully however, because “If an everyday dataviz can’t speak for itself, it has failed—just like a joke whose punchline has to be explained” [1]. For this reason we made sure visualization tasks (touched on later) felt natural, instinctive, organized, and completely understandable to the “average Joe”. By only displaying highly complex visualizations that are merely attractive Information Science oriented personalities, the creators of these visualizations are virtually excluding an entire populus of opinions, ideas, and understandings - almost making them an *other*.

We decided one way to embrace our dreams of interaction would be to strive for a “task-heavy” design. Within tasks we chose **presentation** and **exposition** to convey our datasets. Our idea behind this was creating an entirely interactive data storytelling operation, in which we have multiple different topics under one larger umbrella of the Zero-Waste Movement. We felt our creative take on the project met at a crossroad between data art, storytelling, and scientific visualization in order to “present” an appeal to multiple different types of people. We will touch on project specifics as we speak of their respective tasks.

Under the broad umbrella of **exploration** for the viewer, we wanted their tasks to include the ability to **browse, identify, compare, and summarize**. We created seven distinct visualizations respective to seven different waste/recyclable mediums; aluminum, steel, plastic, wood, cardboard/paper, and a combination of all mediums in

order to get an understanding of the general trends of waste. To understand the scope of this research, over 91% of plastic is landfilled, even with the upward trend of recycling that plastic has seen over the past decade (NatGeo).

Each visualization was “packaged” inside of their respective medium i.e) the graph regarding the disposal of aluminum was wrapped with tin foil. Giving it this element of interaction invited the children into a space of child like euphoria of discovering the unknown. This element of interaction also gave the users the task of **identifying**, as users were able to pick and choose which elements they wanted to understand and focus on, as well as allowed them to **browse** and scan for potentially interesting targets - i.e) Perhaps they were more interested in glass over plastic. Having the graphs separate helps keep information succinct and prevent confusion amongst the viewer. It specifically aids in the prevention of visual clutter, as the users can scan through the visualizations separately as opposed to attempting to search for specific elements within one visualization.

Alongside **identify** and **browse**, users were also able to easily **compare** visualizations. Inside of having to switch between digital visualizations, users could simply hold the two tangible graphs side by side in order to draw their own conclusions.

We utilized the element of **enclosure** to physically group items into a recycling bin. This physical grouping made the understanding that these elements belonged together in the grand scheme of things - i.e) they are all physical waste that can typically be recycled - however they still each contain their own specific datasets when investigated.

Our infographics/“choose your own plastics” storytelling elements helped aid in the task of **summarizing** as they summarized the larger picture of how these visualizations fit in the grand scheme of the environment. We used **uncertainty** elements in our infographics as well, specifically “sketchiness” in order to be transparent about some statistics we revealed.

While our infographics are ideally meant for any age group, they were designed in away to aesthetically appeal to younger audiences. This was determined by investigating contemporary visual trends and successful infographics.

To further expand upon our infographics, we developed them in order to be supplementary storytelling devices that allowed us to further our audiences knowledge on the subject. Not only was the viewer invited to learn more within our infographics, but they were given options for basic ways in which they could change their consumption habits towards a more zero-waste lifestyle. Once the viewer’s interest was piqued by the interactive childlike “gift opening” experience, the viewers attention will remain caught thanks to the visually enticing design experimentation occurring within the infographics that can be considered our *data art*.

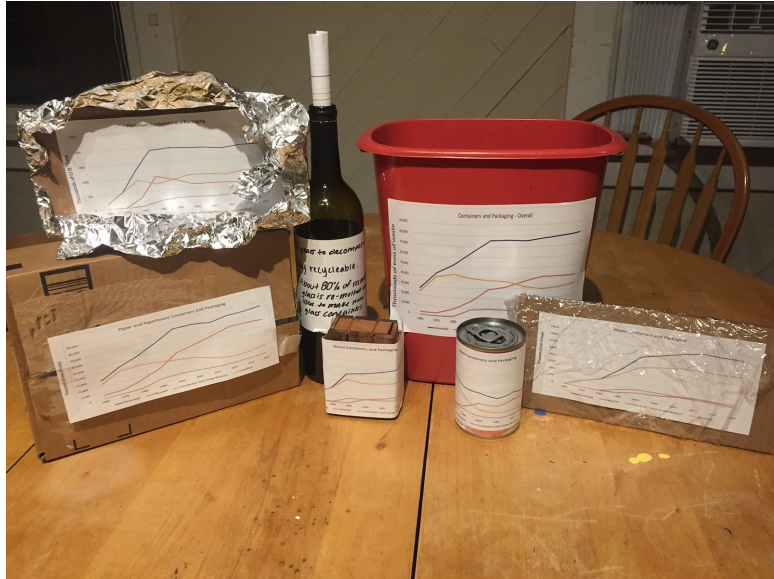
4.Findings

Our findings were accurate to what we had previously assumed. Several of our peers flocked to our station intrigued by the physicalization as well as design elements of our practice. Since Julia is majoring in Media Production, we collectively wanted to generate something that combined both skill sets. Because of this, we found aesthetic elements working to our advantage as people truly enjoyed unwrapping and investigating elements, as well as working their way through our interactive interfaces designing for phone screens. It was particularly rewarding to watch peoples’ faces light up when they discovered zero-waste alternatives such as shampoo bars.

If we were given the opportunity to do this again, we would likely try to incorporate more elements. We were given feedback that it reminded the audience of interactive museum displays, which was positive feedback. In the grand scheme of things if we were able to expand and explode our project into something bigger, we believe it would be a really cool opportunity to make an entire museum exhibit out of the concept. This would likely include the expansion of ways to look at data, as well as expanding our respective data sets to include a wider range of topics.

Link to Paige's infographic: <https://xd.adobe.com/view/6c963878-2c24-4fe1-5ce6-3c729c814ca7-1aa7/>

Link to Julia's infographic: <https://xd.adobe.com/view/9cf80e91-3e61-42f2-5cb5-bbeee51d85a8-eac9/>



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