Improving Social Impact for Non-Profit Organizations

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INFO 247: Information Visualization, Spring 2023
[aloraclark.github.io/reignite-infoviz/]
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1. Project Goals

A nonprofit organization (NPO) is one that operates for the benefit of the public, rather than a business aiming to generate profits. These organizations heavily rely on donations in order to maintain financial stability, but this can be extremely difficult to achieve. According to the National Association of Nonprofit Organizations & Executives, approximately 30% of nonprofits fail to exist after 10 years. One of the many reasons is forgetting or not prioritizing donor relationships. Without donors, NPO’s are unable to serve their intended communities, making their missions pointless.

The importance of NPO’s within communities isn’t always acknowledged, but studies have found that they have the following strengths: “linkages to vulnerable or marginalized people, strong networks, [and] the trust of the population.” (Roberts, et al.). NPO’s are essential to communities because they tend to address needs that aren’t always prioritized by the general public. If we allow NPO’s to continue to fail, we’re stripping away support networks from communities who rely on them.

In order to address the high failure rate of NPO’s, we chose to focus on this topic for our graduate capstone project at the School of Information in the University of California, Berkeley. After learning about non-profit and donor pain points via interviews, surveys, and literary research, we created Reignite. Reignite is a non-profit organization that aims to amplify the impact of small NPOs by making it easier for community members to identify and learn about NPOs. By improving transparency and community building, we can help NPOs develop more meaningful relationships with their supporters and make it easier for donors to make informed decisions when donating.

Our visualizations will specifically focus on exploring patterns between people who do and do not donate. Similarly, we will explore patterns between and within different types of NPO’s. Ultimately, we hope to use our findings to inform NPO’s of best practices that could help them establish meaningful relationships with existing and potential donors.

2. Discussion of Related Work

2.1 The Center on Philanthropy at Indiana University - [Link]

This report was published in September 2021 by Indiana University’s School of Philanthropy. They studied the donation patterns, priorities, and attitudes of affluent U.S. households for the year 2020, building on findings from previous studies. We found this relevant to our report because it provides donation patterns
across different groups of donors using a random sample of 1,626 wealthy U.S. households. Although the group sampled differed from the survey we conducted, we hoped to see similar patterns that corroborated our findings.

We did not have access to their raw data, but we expanded upon some of their existing visualizations to create our own. For example, Figure 1 (below) shows a horizontal stacked bar chart from the original report. Initially we felt overwhelmed with the amount of information being conveyed, leading us to think about how we could reduce the effort needed to understand this visualization. We included a similar visualization in our website (section 3.5.2), but we cut back the options shown to make it less intimidating and included some interactivity.

**Figure 1** - Survey responses to the question “Now, after you make a gift to an organization, how important is it to you that the organization will: “. This graphic was produced by The Center on Philanthropy at Indiana University.
2.2 Roberts F, Archer F, Spencer C (2021) - [Link]

Published November 2021, this paper explores whether Australian non-profits contribute to building community resilience to disasters. They found a variety of strengths across NPO’s: their ability to provide faster response speeds, access to diverse or vulnerable populations, increased local knowledge, and solid community trust that has been established over long terms.

Although our project does not focus on NPO’s in the disaster relief sector, these findings helped us argue for the importance of supporting small, lesser-known nonprofits. We are demonstrating the need for nonprofits by highlighting the impact NPO’s can make when they understand their user base and relate to their needs. Additionally, the importance of long term trust between NPO’s and their community can be used to support our product’s need to establish credibility; a stepping stone to long term trust. These findings will be essential when presenting our value to stakeholders (NPO’s).

2.3 Gilded Giving 2022 - [Link]

This blog post was published in July 2022, by Inequality.org in order to highlight how wealth inequality has impacted the nonprofit sector. They presented some key findings regarding how donation patterns have changed over the years; specifically focusing on different statistics. For example, Figure 2 shows how donations across different household income levels have increased or decreased from 1993 to 2019.

The findings presented helped us determine which statistics would be most useful to NPO’s, influencing the information we chose to present on our website. More specifically, it led to us including the average annual income and age across those surveyed.
Figure 2 - This graphic is from Inequality.org

2.4 World Vision - [Link]

This was published by World Vision in November of 2016. They analyzed 10 million tweets from Twitter to gauge which emotions people express when giving and receiving; specifically focusing on anger, joy, sadness, fear, and disgust. While joy and sadness was expressed across the categories of tweets analyzed, they found that joy was significantly more prominent.

We were drawn to Figure 3, a radar chart that depicts their findings regarding the emotions associated with giving. This chart led us to thinking about how we could use a similar chart to highlight the non-profit characteristics people deem most important. This resulted in our “The Perfect NPO” chart, which quickly shows users the characteristics people have strong opinions on.
2.5 Fidelity Charitable Report - [Link]

Fidelity Charitable published a report in 2016 based on their research regarding barriers that prevent donors from giving. This report overlaps with our capstone project; it explores reasons why donors don’t donate as much as they would like and solutions NPO’s can implement to address these issues. Their most surprising finding was that two thirds of American donors want to increase their donations, but there are a variety of barriers that keep them from following through.
Our team found similar barriers through the interviews and surveys we conducted. This report was especially relevant to this project because it gave us inspiration on how to visualize the barriers we found. For example, Figure 4 is an excerpt from the report that uses quotes and pie charts to show donors top concerns. We found the combination of synthesized data (pie charts) and direct quotes to be very impactful in communicating what users wanted without diluting their needs. In our project, we chose to create word clouds that emphasized the main concerns among participants. Additionally, we created a pie chart for each word cloud cluster (3 total). This allows viewers to grasp the main idea quickly and move on, or explore the word cloud for more insights.

Figure 4 - An excerpt of Fidelity Charitables 2016 Report.
2.6 GivingTuesday Data Commons - [Link]

This report was published by the GivingTuesday Data Commons, focusing on donation trends in 2021. They found that donations were not declining overall, rather more NPO's were focusing on large donors; therefore, this shrinking pool of donors felt more impactful. In reality, this highlights the importance of having a diverse pool of donors, rather than just catering to large sum donors.

We found this relevant to our project because it helps us advocate for less wealthy donors. Our website focuses on the needs of these types of donors so we believe it’s important to have resources that uphold our decision. Although this is not something that we’ve been asked to defend thus far, many of the NPO’s we interviewed mentioned aiming for large corporate donors rather than individual donors. Because of this preference, we believe concerns will be expressed at some point in the future, leading to us referencing this source.

3. Visualization Walkthrough

Our main goal is to give recommendations to NPOs about how to improve their social capital. The visualizations are delivered by first framing the problem through highlighting donor pain points and then providing viable solutions that will address these pain points. The visualizations in this website are flat and interactive with each having an associated text box in order to provide deeper insights and takeaways for our main audience, non-profit organizations.

This project is supplementary to our capstone project. Because of this, the color palette for this website is made up of colors from our app, with some additional colors added. Our fonts were also chosen with the capstone application in mind. Since our app is a variation of social media, we decided to keep the fonts whimsical, fun, and fresh without being too difficult to read.
3.1 Header

Figure 5

In the past 6 months how many times do you think the average person has donated to a Non Profit Organization (NPO)?

The website opens with a variation of a question from our survey “in the past six months how many times do you think the average person has donated to a Non Profit Organization (NPO)?” We begin with this question because not only is it attention grabbing, but we understand that this is likely something that leaders of NPOs are interested in knowing. This is followed by an icon of a coin being deposited into a box. We chose this icon because although donations can mean anything, we want to prime the user to think about monetary donations as opposed to material goods or something more abstract such as volunteer hours.

Aww! Have a little more faith. Keep scrolling to find out the correct answer!

Unfortunately, you are incorrect :( Keep scrolling...the answer might surprise you!
Following the icon we have a text box where the user can strictly input a number and press enter to discover if they were correct. If the user enters a number less than four they are met with the response in figure (6), if the user enters seven they are informed that they guessed correctly, and any other number is met with the message in figure (6). We decided to add more interesting responses other than “correct” or “incorrect”, because we wanted the website to feel engaging and welcoming, and we wanted to give users an opportunity to get a different response if they chose to guess again. At the end of each message, the user is instructed to continue scrolling in order to find out more information. The user is also prompted to continue scrolling by the animated arrow located at the bottom of the header.

3.2 Donation Frequency in the Last Six Months

Once users scroll they are shown a chart that highlights the correct answer and provides further detail.
We decided to include this bar chart to give more insight into the answer in our header and we made it a point to include where the average falls, because we understand that summary statistics do not reveal the whole picture. By including the red line we are able to show that even though the average is approximately 7 times (7.134 to be exact), most people have donated less frequently over the last six months. To signify this even further, we decided to highlight the bar with the highest frequency and chose a darker, more muted color for the rest of the bars. By coloring the other bars in this way, your eye is immediately drawn to both the average line and then the highlighted bar on the left.

As is standard practice, we also included a title and axes labels. The axes labels are especially important because we are representing two quantitative variables and do not want users to be confused about what the chart represents.

Users can then move on to the next section to get more information about who was surveyed.

3.3 Who Was Surveyed

We decided to include some information about who was surveyed because we thought it would help the visualizations following to be more compelling. If our audience is unaware of the types of people who share the sentiments presented in
the sections following, the visualizations may not be as impactful. Additionally, we felt that it was best to display information about our survey participants based on their most recent kind of employment, because we are mainly discussing monetary donations.

To display this information, we used a rendition of a horizontal bar chart where each icon represents two people. This way our audience knows how many members of each group participated in the survey.

At first glance, this section is all the information that seems to be presented about who we surveyed. However, when clicked, the button on the side reveals a collapsible section that provides more information about the participants of the survey. (This button can be clicked again to hide this section.) This button is animated to wiggle and has some text around it so the user does not miss it.
We chose to include this visualization in a collapsible section because we ultimately would like the latter sections of the website to be the main focus. If this visualization remained on the page, we were worried that it might make the website look too cluttered and take away from the other sections.

In order to connect the two visualizations, we represent each of the three categories with their respective icons. Here, we use this visualization to display the average age and income levels of the survey participants. We felt this information was important to include so that our audience, non-profit organizations, can see that the pain points and barriers people experience when trying to donate are common regardless of age or income level.

Once our viewers have finished digesting the information in this section, they can move on to finding out what things are important to donors, how they connect with NPOs, and what are some of the barriers they face when donating.

3.4 What is Important to Donors

3.4.1 Important Characteristics of a NPO

We start the section by introducing what characteristics of a NPO people find to be the most important. In the survey used to gather this information, participants were asked to rank the following characteristics in order of importance, where each level of importance (not important at all, of little importance, moderately unimportant, slightly unimportant, neutral, slightly important, moderately important, very important, and extremely important) could only be selected once.

We felt the best way to represent this information was to use a radar chart with multiple categories. Each characteristic has a unique and distinguishable color so that it is easy to see when they are all stacked together. We decided not to make the colors for the categories similar to our brand colors, because we felt that it would take away from the readability of the chart. The chart also has adjustable axes, designed to fit whichever chart has the most people at one level of importance.
Additionally, we understand that stacked charts of any kind, especially radar, can be a bit overwhelming. To alleviate this, the legend colors are designed to be clickable so that they can be removed or added back to the overall chart. Designing the chart in this way is really beneficial because it limits the number of sections required on the website (so that it does not become too long and boring), and it allows for comparison between any of the categories that the user wants to see.
Figure 11

The chart is also designed so that if you hover over any of the points you can see the specific category, associated color, and number of people who responded with that level of importance.

Once the user is finished interacting with the radar chart they can move on to discovering how donors find NPOs to connect to.

3.4.2 Ways People Find NPOs

During the research stage for our capstone project, we heard that many NPOs struggle with brand recognition, finding ways to find new donors, and convincing donors that they are the right NPO to donate to for a specific cause. While it is out of scope for the goals of this website to touch upon all of these things, we felt as though it would be helpful to let NPOs know how donors connect with them. Although it does not directly address the pain points that they have, it does inform the recommendations that we provide later on and hopefully can help to orient any solutions that they might come up with.
We chose to represent this information with a horizontal bar chart. We decided to keep this simple because the overall section already has two charts that may be unfamiliar to some users. Also, we felt that by keeping this visualization simple it would maintain that the overall information in the section remains digestible.

![Bar Chart](image)

**Figure 12**

We chose to highlight the two most frequent bars, so that the user could understand that donors connect to NPOs most often through personal connections. We also decided to use the same colors for this bar chart as our bar chart in the header in order to maintain a theme across all of our charts (excluding the multiple radar chart). For this chart, we only included a x-axis label because the y-axis is self explanatory based on the title. This graph also has some level of interactivity as you can see the precise frequency of each bar on mouse over.

Once the user is done, it is time for them to move onto the last visualization in this section.

### 3.4.3 Barriers Word Cloud

There are many barriers that donors face and in the exploratory data analysis section of this project, we discovered that these barriers usually fall into six distinct categories: money, time, physical, trust, knowledge, and other. ‘Money’ contains anything pertaining to money such as having money and types of money
(cash, card, etc). ‘Time’ encompasses the ways the participant might spend their time, having enough time, measures of time (hours, monthly, now, etc). ‘Physical’ is any kind of physical barrier the participant might encounter when trying to donate. ‘Trust’ pertains to things a NPO could do to breach trust and maintain trust. Lastly, ‘knowledge’ contains things that participants want to know more about and words that describe varying levels of surety about finding NPOs. For simplicity and effectiveness, we chose to display three of these six categories: ‘money’, ‘time’, and knowledge. Additionally, these categories contained the most words and consisted of the most recurring words.

In order to represent this qualitative data we decided to use a word cloud. Initially, we created one big word cloud consisting of all of the words within these three categories, but we quickly realized that it was hard to distinguish the three categories and get anything out of the visualization.

We pivoted instead to include three distinct word clouds where the words were color coded and categorized based on the three themes that we decided to include. This increased the readability of the visualization and the clarity as it was more obvious what the overarching theme of each barrier is.
3.5 Recommendations

Now that we have framed the problem space by sharing with our audience who was surveyed and how they interact with and think about non-profit organizations, it is time to move into the final section of the website. In this section we make some recommendations to NPOs about how to address the problem space and alleviate the pain points that donors are experiencing.

3.5.1 Personalization Pie Charts

Our first recommendation is personalization of donor experiences. Although we have provided visualizations in earlier sections that hint at the idea of a personalized donor experience, we felt as though it was important to include a few more examples of why personalization is important.

![Figure 14](image)

The first pie chart showcases that most people have trouble identifying what they care about, while the second and third showcase how people want to expand their knowledge about donating and connecting with non-profits in the ways that are unique to them, such as the right volunteer opportunities and integrating charitable giving into their yearly budgets.

We understand that pie charts can be quite finicky when utilized improperly, so we made sure not to include multiple categories in one chart and keep the colors consistent as we did for the earlier bar charts. There is also a thin white border between each section so that the colors are not reverberating or running together. Additionally, we know that it is often hard for people to accurately estimate what the percentage of a pie chart section is, so each chart has a mouse over feature that tells you the exact percentage of each section.
3.5.2 Stacked Bar Chart - Transparency

The second recommendation is increased transparency. This visualization was inspired by a visualization in a study by The Center on Philanthropy at Indiana University and Bank of America.

![Figure 15](image)

For our version of this visualization we only selected a few categories based on the goals of our webpage and the theme of transparency. We also adjusted colors to match our color palette and made sure that they were distinguishable from one another (as we felt the original design used colors that were too similar). Furthermore, we made sure to include a x-axis label as we felt that the y-axis was self-explanatory based on the title.

![Figure 16](image)
We also improved upon the original design by making our visualization interactive. A user can interact with this chart in the same way that they can with the radar chart in the ‘what is important to donors’ section. By clicking on the colors in the legend, the user can add or remove parts of the stack. This allows for easy comparison between and amongst categories. Additionally, the user can see the exact percentage that each portion makes for a singular bar on mouse over.

### 3.5.3 Streamlined Donation Methods Statistics

The last recommendation that we make is that NPOs should streamline their donation process. In the last several years, cash and checks have been a declining form of payment. Many people use debit cards, credit cards, electronic wallets, and other means of payment when purchasing goods or services. Hence, making a donation should not be any different.

![Figure 17](image)

We thought the best way to show this growing trend was by displaying some statistics about how people donated in 2020, in an infographic style. For each statistic we used icons of people, where the numerator of the fraction is highlighted. The colors we chose for this infographic are consistent with the other charts we created and the font used is also consistent with the subheadings and labels used in the other visualizations.
4. Data

Our data came from three sources: a survey and various interviews from NPOs, donors, and non-donors conducted as part of the research phase of our capstone project and a study about donation patterns of affluent donors conducted by The Center on Philanthropy at Indiana University and Bank of America. We chose to use two different sources because our capstone data is mostly qualitative while our second source was more quantitative in nature. We also felt that the second study paired well with the insights from our capstone survey, as many of the insights found were very similar.

4.1 Survey

We received a total of 74 participants for our survey. Our survey participants were gained through convenience sampling as the survey was disseminated through Slack channels, text message, and word of mouth. We then used the prepared google excel sheet and very rough EDA that google sheets provides to discover what our key findings might be.

For this particular project, we found the following categories to be the most insightful: ‘amount of times donated in the last six months’, all of the ranking questions, ‘barriers to donate’, and demographic information such as annual household income, age, and most recent type of employment (student, part-time, full-time).

4.2 Interviews - NPOs

We conducted 5 semi-structured interviews with NPOs in education, politics, tech, and accessibility. These distinct groups allowed us to identify issues that are common across all types of NPOs.

Participants were recruited through convenience sampling. We reached out to professors who had connections with NPOs and asked them to make an initial introduction. We would like to acknowledge that this may have introduced some self-selection bias, as these NPOs already had a strong relationship with our university and thus could have been more willing to participate in our research.
Each interview ranged from 40-50 minutes. After receiving participant consent, these interviews were recorded and placed in a private folder that could only be accessed by team members and our advisor. Once interviews were completed, we created an affinity diagram using FigJam; this allowed us to extract common themes across interviews.

4.3 Interviews - Donors & Non-donors

We conducted 8 interviews with people of varying ages, backgrounds, and income levels. Diversifying our interview pool in this way was extremely important because it allowed us to get a full picture of the themes that all donors and non-donors experience.

After receiving participant consent, these interviews were recorded and placed in a private folder that could only be accessed by team members and our advisor. Each interview ranged from 30-40 minutes, and once interviews were completed, we created an affinity diagram using Mural which allowed us to extract common themes across interviews.

4.3 The Center on Philanthropy at Indiana University and Bank of America Study

Please see section 2 for more information about this study and how we used it in and as inspiration for our webpage.

5. Tools

Exploratory Data Analysis was conducted using a combination of Observable, Google Sheets, and Google Forms. The visualizations were created using a combination of Observable, Figma, and ChartJS. ChartJS is a helpful Javascript plugin that allows you to seamlessly create various interactive and flat visualizations.

The overall website was built using HTML, CSS, and Javascript. All of the icons on the website are hosted on flaticon.com and majority of the fonts were imported from Google Fonts. Lastly, the website is hosted on a github.io domain.
6. Results

6.1 Web Page Design

Our project is displayed on a single-page, scrollable web page. We chose a simple design that's predominantly black and white, with a few pops of orange and blue, and two typefaces. We used short summaries throughout our webpage to summarize the main takeaways of each visualization. We chose orange as our main color because our product's name, Reignite, leads to images of fires and sparks. We chose to accompany this with blue because it compliments the oranges.

Our webpage begins by having visitors consider what they believe the average donation looks like. We were inspired by the interactive New York Times visualization, “You Draw It: Just How Bad Is the Drug Overdose Epidemic?” This had been very impactful as it forced us to reconsider our preconceived notions on the topics discussed. We aimed to create a similar feeling by having website visitors guess before showing them the actual averages. We then move on to statistical background on who we surveyed, what donors found most important, and how NPO's should address these concerns.

6.2 Usability Testing

Our usability studies were conducted in-person. We found three participants who agreed to be part of our usability testing. Due to time constraints, our recruitment approach was to use convenience sampling. Therefore, we reached out to people in our networks. These participants differed in their donation habits and knowledge of non-profit organizations. All participants currently live in the Bay Area and are full-time students.

For each usability test each participant was given a consent form where they agreed to being recorded. Although testing occurred in person, Zoom was used to record the session. This allowed one team member to conduct the interview and share the recording to the second team member later on. Responses and actions were recorded on a shared document during and after the testing session.

For testing purposes, we chose to use paper sketches of each visualization and ask participants questions on what interactions they expected and their main
6.3 Usability Testing Results

Our results showed that our sketches were overall effective, but there was room for improvement. The types of improvements differed based on the measure.

For quantitative measures, our biggest issue was communicating interactivity. In some cases this may have been due to having sketches rather than digital visualizations. For example, for 3.1 users attempted to click on the arrow rather than viewing it as an indication to scroll down. On the other hand, for 3.4 users did not attempt to interact with the radar chart legends. To us this indicated that any type of interactivity was not apparent on this screen. When presented screens 3.2 and 3.3, participants did not have any questions or points of confusion regarding the possible interactions or meanings.

For screen 3.2, the most important qualitative measure was the lack of clarity around what the bar chart was representing. There were specifically points of
confusion on the axis labels and the data source. On the following screen, 3.3, participants expressed confusion on the relationship between the donation statistics and the donation frequency. It was not clear that these two visualizations were not related and thus they expressed confusion on how they would influence one another. Finally, participants were overwhelmed by the radar charts, 3.4, and asked for more information on the meaning of each value.

Overall, participants felt that our visualizations were mostly effective in communicating our findings, but some clarifications were necessary to address interactivity and data sources.

### 6.4 Revisions to the Design

Based on the feedback we received from participants in our study, we made a few changes to our visualizations. Additionally, we made them digital, allowing us to introduce color and implement the interactions.

Our first change was adding text that gives more information on our data sources. This allowed us to clarify whether a visualization was using our survey data, our interview data, or data from online sources. Similarly, we clarified the meaning of all our visualizations by adding more descriptive headings, summaries that explain the main takeaway, and clear axis labels. One crucial change was reducing the cognitive load necessary to understand our radar charts by replacing the likert scale numbers with text. This prevented users from having to constantly check whether the number 1 meant “not important at all” or “extremely important”. Finally, we included text and animations that highlight possible interactions. For example, the arrow on our homepage bounces up and down to indicate scrolling.
7. Link to Repository and Code

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8. Team Contributions

Low contribution, medium/equal contribution, high contribution

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