

your data, for you Usability Test Write-up



Akshay Dan Bhavish Juleemun, Ameya Naik, Ian Mulholland

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Introduction

Privacy can be a very complex, complicated, and ultimately, intimidating, concept. We all value privacy to some extent, but there is an asymmetric relationship between the information that we have on platforms that collect information online and the users that leverage these platforms. *your data, for you* is a project designed to correct this imbalance.

Our visual has narrative and quantitative elements to describe the concepts of privacy and provide users with insights on what is collected, how data is used, and ways that users can take control of their data when it comes to online platforms. For *your data, for you*, we also received feedback from users on our qualitative components, quantitative visuals, and theme and incorporated changes.

Project goals

Privacy affects everyone, yet the concepts and resources around privacy are steeped in legal, political, and technical jargon that make it difficult to define practical solutions. Unfortunately, not everyone has the opportunity to take INFO205 or the time to read Privacy Policies for everything that they sign up for.

The goal of our project is to improve the accessibility of privacy concepts for everyone and simplify the overly complex privacy regulations out there. We want visitors to leave with interest to engage with privacy rights, rather than check a Terms of Service agreement and move on. Privacy may affect everyone, but understanding and acting on rights to privacy, may not be accessible to those that need it most.

Our project tries to simplify and demystify privacy by:

- **Informing** users of what privacy is and how it has changed.
- **Increasing awareness** of how online platforms and services collect and use data.
- **Engaging** users through interactive elements.
- **Inspiring** users to learn more about their data.

Accordingly, we have several subcomponents for each:

Module	Section	Visual Components	Function	Task	Tech
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1	What is online privacy?	Icons + Magnifying glass	Present information		Text/HTML
1	How has online privacy changed?	Timeline Animation Graphs?	Organize information Compare information	Compare values	D3.js (Observable) Timeline
1	Why is privacy important?	Icons	Present information		Figma images on HTML
1	Major Privacy Issues	Icons	Present information		Figma images on HTML
2	What are companies collecting?	Graph	Compare information	Identify extrema Compare values	Observable Plots
2	What are your rights?	Icons	Present information		Observable or Figma
2	Steps to take to improve your privacy	Flow Chart	Organize information		Figma /D3
2	DSAR instructions	Flow Chart	Organize information		Figma/D3
3	Netflix dashboard	Dashboard/graphs	Organize information Compare information	Identify extrema	Tableau +GIF of usage (based on screen recording)

Discussion of related work

We draw inspiration from several sources for our work for both storytelling and visualizing privacy related data:

Content and Storytelling

[The New York Times Privacy Project](#)

The NYTimes has authored a number of articles on broader issues around surveillance or cybersecurity. We tried to emulate the vignette style story-telling model in early iterations of our project.

[Privacy Not Included](#), by Mozilla

Mozilla developed a guide and a compilation of reviews for specific products (e.g. voice assistant tools) in a clear, user-friendly manner. We took inspiration from the guide's comparisons of different technologies' privacy policies and its definitions of privacy.

[Usable Privacy](#)

Usable Privacy is an analysis of privacy policies of popular technology companies, showing the difficulty of interpretation of legal text. When researching early storytelling techniques, we were drawn to Usable Privacy's approach to simplifying complex, privacy-related content.

[See No Evil: Loopholes in Google's Data Safety Labels Keep Companies in the Clear and Consumers in the Dark](#), Mozilla

See No Evil is a research paper showing the lack of transparency around what data is collected by popular apps. In early ideations of our work, we were inspired by the organization and compelling storytelling of privacy in every day life.

[When Your Data Tells You Who You Really Are](#), WSJ

A 2023 article in the Wall Street Journal lamenting the lack of sharing of data about users' habits with the user themselves. This piece validated our need to educate people on their privacy rights.

Visualizations

[World's Biggest Data Breaches and Hacks](#), David McCandless & Tom Evans (Information is Beautiful)

World's Biggest Data Breaches and Hacks is an exhaustive list of data breaches and their magnitude over the years, represented by bubbles in a timeline. While this inspired our visualization of breaches over time, we found it to be a bit complex and hard to interpret and used this project as an exercise of improving this existing artifact.

[TikTok Unwrapped](#), Oscar Chan and Angela Liu

We also took inspiration from our peers. TikTok Unwrapped is a set of data visualizations (collapsible tree, bubble chart) showing the power of a DSAR (as used for TikTok). However, it focuses on ads and doesn't go enough into examples of other data (e.g. the user's habits).

[Outdoor Ambient Air Pollution](#), Astoria Ho and Clara Hu

We took inspiration from our peers' use of interactive elements here. We thought that the survey was a great way to engage and reinforce the lessons and goals of our visual.

Visualization

The site can be accessed [here](#), with its code in our Github [repository](#).

Visualization Walkthrough

Our visualization consists of text, icon, chart, interactive, and animated elements in order to make privacy accessible and actionable.

Introduction

Our introduction includes animation and interactive elements to engage visitors from the start. While subtle, our animation of a computer scrolling aims to represent how quickly users look through user agreements on the way to clicking the Terms of Service agreement.

We also included our own artificial Terms of Service (and a poor attempt at humor!) to get users into thinking about what they are agreeing to right away.

Introduction to your data, for you

Take a second to think of every website, online store, app, platform, or service you have given a phone number or email to. When was the last time you read the Terms of Services? If your answer is "never," don't worry - you're not alone. In fact, studies estimate that over 91% of people consent to Terms of Service without ever reading them. For younger people between the ages of 18 and 34, this number is even higher, at 97% [1]. This means that the vast majority of us are blindly agreeing to terms that we may not fully understand, potentially putting our online privacy and security at risk. Online privacy doesn't have to be complicated, intimidating, or burdensome. This guide is designed to provide you with a simple and straightforward understanding of what online privacy is, why it matters, and how you can take steps to protect yourself. You'll find practical recommendations and tools that can help you improve your privacy and regain control over your data.



First, let's dive into our Terms of Service

I agree to the terms

What is Privacy

Our next section creates a baseline definition of what privacy is. Privacy is a concept that's not solely defined by the introduction of online platforms. In this section, we used icons to visually represent the two pillars of what comprises the definition of what privacy is.

What is privacy?

We all probably close and lock the door behind us when we leave home so no one comes into our home and rummages through our possessions, we all probably use headphones when we're listening to an embarrassing song in public, and we all probably prefer if our doctor doesn't live Tweet our medical appointments. Privacy is a concept that we regularly practice and value in our daily lives, and it has been explored and discussed for millenia by philosophers, legal scholars, sociologists, and technologists. However, online privacy differs slightly from the way we typically practice privacy in our offline lives. Online privacy is less about what we are doing and more about who we are and what we are doing. It's about protecting our digital identity and personal information from being accessed or misused by others on the internet [2].

There are two interpretations of privacy:



Privacy is the right to be left alone

Privacy is the right to be free from intrusion or unwanted attention, to control one's personal information, and to be able to express oneself freely without fear of surveillance or censorship.



Control over personal information

Users should have control over their personal information, including how it is used, processed, and accessed by others, as it is often considered an extension of their self.

We created icons by to represent the two foundations of the definition of privacy we are using.

How has Online Privacy Changed?

The definitions and what is acceptable in terms of privacy norms changes over time and across cultures. However, recently online privacy has emerged as an important topic in public discourse and policy. To show how privacy has changed from the early days of the Internet, we designed a timeline. We designed our timeline purposefully with whitespace so that users focus on each specific era individually.

Within the timeline, we also used several visual components to aid our story. We used an animated line graph to show the exponential growth of Internet users and how

powerful individual collection by companies has become. We also used animation to show the number of breaches that happen to Americans on average.

How has online privacy changed?

In recent years, there has been a significant shift in public perception around privacy practices of companies. With increasing public awareness around data breaches, online tracking, and targeted advertising, people are becoming more concerned about how their personal information is being collected, used, and shared.

2000-2004: Emergence of the Digital Age

In the early days of the internet, data privacy concerns were minimal. Companies, like Google, processed data collectively, rather than on an individual level. This meant that the information collected focused mainly on the search terms and clicked websites, rather than the users' browsing history, location data, or social media activity.

There are **40,000** searches on Google every second.

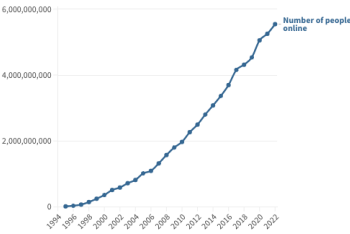
Source: https://firstsiteguide.com/google-search-stats/#_text=There%20are%2040%2C000%20Google%20searches%20every%20second

A Flourish data visualization

2005-2011: Data-Driven Advertising and Mobile Internet

As the number of internet users increased, companies began focusing more on individual data collection. Facebook and Google were among the first to realize that individually processed data could be used more effectively for advertising purposes. Smartphones and social media provided new opportunities for tracking and advertising. However, with these developments came the first instances of major data breaches.

Number of people online over time



Source: [Internet World Stats](https://www.internetworldstats.com/)

A Flourish chart

2012-2017: Increase in Data Breaches and Decrease in Trust

Over the years, data breaches have become more frequent and extensive. Between 2012 and 2017, there were over 130 data breaches, with the largest being Yahoo's breach that affected three billion accounts in 2013. In total, over 4.5 billion records were compromised in just five years, and up to one in three Americans experienced a data breach every year.



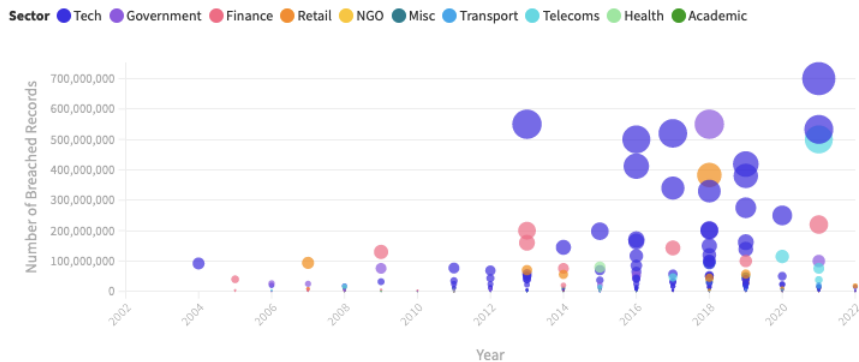
2018-Present: Stricter Data Protection Laws

After two decades of widespread internet use, people and governments have come to recognize the criticality of safeguarding personal data [1]. Over 80 countries have implemented privacy and security laws related to the internet, and both companies and governments are striving to improve the subpar standards left over from the internet's early days.

Why is Privacy important

In our next section, we wanted to convince visitors to our page that there are and always will be risks to online privacy that are largely out of their control. We used the [World's Biggest Data Breaches and Hacks](#) dataset to visualize how breaches have not only increased in number, but also severity over time. A dedicated visual for data breaches, with year on the x axis and the number of breached records on the y axis. Our contribution is its plotting as a scatter plot, with the size of the dots representing the magnitude of the breach, and color coding showing the industry the breach happened in. Upon hover, the company involved in the breach is also revealed. The goal of the visual is to identify extrema (especially by the size of the dot) and see relations (higher frequency, and bigger breaches over time).

Largest Online Breaches Overtime



In this section, we also included an interactive element that compels visitors to reflect on what they sign up for and how being intentional in which platforms you are sharing information with can limit exposure to potential breaches.

It is essential to understand that privacy breaches can happen to anyone, and the risks increase when we have multiple online accounts. The more accounts we have, the higher the risk someone can use compromised login credentials to gain access to multiple accounts, steal sensitive data, and cause irreparable damage to our online reputation.

Can you guess how many online accounts an average American has?

How many accounts does the average American have?

Why is Privacy important

In our next section, we aimed to increase the awareness of our tool's visitors by showing what data is collected on them. We went through the Privacy Assessments in CommonSense for each platform and mapped the collection policies of each service. We created heatmap with a spectrum of sensitivity of information on the x axis, and an unordered list of well-known technology companies on the y axis. Each tile on the heatmap is color-coded to represent whether they share a particular type of information, as revealed when you hover it. The goal is to enable comparison and make it easy to identify extrema. For example, Facebook and YouTube have an extensive data collection policy, as opposed to others like Slack.

This visual was re-iterated upon as we moved away from Zoom Circle Packing and Collapsible Tree charts (see usability analysis below).

What are companies collecting about you

Anytime you agree to a Terms of Service, you agree to share information and data about yourself. So what are companies collecting and using?

What do platforms collect?

Answer ■ Yes ■ Maybe ■ No

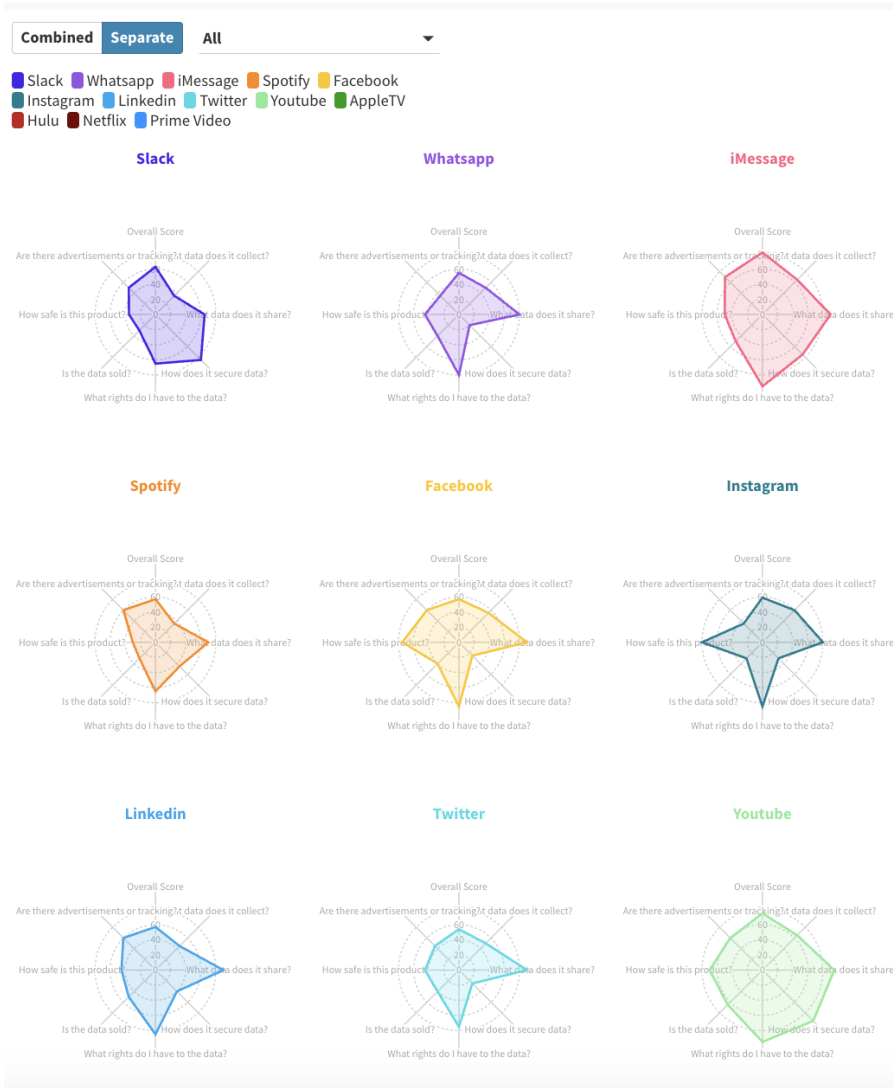


Source: [CommonSense](#)

A Flourish heatmap

How do companies compare with each other?

It is one thing to know what platforms collect, but we also wanted to communicate the risk of how each platform collects, uses, and stores data. We also went through the scores of each platform on CommonSense and compiled their ratings into radar charts. We made this visualization interactive by allowing users to combine the radar charts into one chart or separating them for different comparative strategies. Our rationale was that it might be easier to compare all of the platforms separately, but might be easier to compare platforms by type on one radar chart to see how they compare when overlapped on one another.



Steps to take to improve your privacy

Our next section was focused on providing users with the resources to improve their privacy online. We began with a section on how to limit online tracking. We included an interactive element and analogy of a cookie and “Grandma Google’s Cookie Recipe” as a way to explain to users what is behind online cookie tracking.

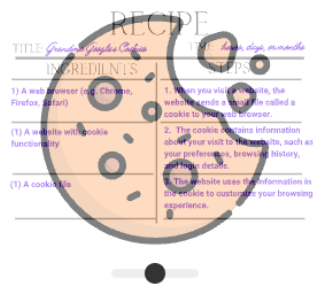
Steps to take to improve your privacy

It may seem like there is no way to prevent companies and governments from using your data, and that privacy is a battle won and fought in court cases and litigation. That's far from true! You can take steps to ensure that your data remains under your control. Here are some immediate ways to improve your privacy online.

Limit who tracks you

Knowing how companies track users online is important because it can have significant implications for one's privacy and security. Companies can collect data on users' browsing habits, search history, and personal information, which can be used for targeted advertising, identity theft, and other nefarious purposes. To pay attention to cookies, one can adjust their browser settings to control cookie usage, delete cookies regularly, and use private browsing modes. It's also important to be aware of the types of cookies that websites use, such as first-party and third-party cookies, and what they do. Using ad blockers can also be a useful tool for protecting one's privacy online. Ad blockers can prevent websites from displaying ads, which can often be a source of tracking cookies and other types of tracking scripts. However, it's important to note that some websites rely on ad revenue to function, so it's important to be selective when using ad blockers and whitelist websites that you trust.

Use the toggle to see the recipe for online cookies



Our next section included information on how to improve passwords so that if (and when!) if someone is involved in a breach, the damage is limited. We included another interactive element where users can improve a password by clicking a button to level up the protection.

Have a strong password

A strong password makes it much more difficult for an attacker to gain access to your accounts, even if they manage to obtain your username or email address. With the increasing number of data breaches and cyber attacks, it is more important than ever to use strong and unique passwords for each of your online accounts to minimize the risk of your personal and financial information being compromised.

Over **21 million** people use "password" as their password. Click the button below to see how to improve the strength of that password.

Password

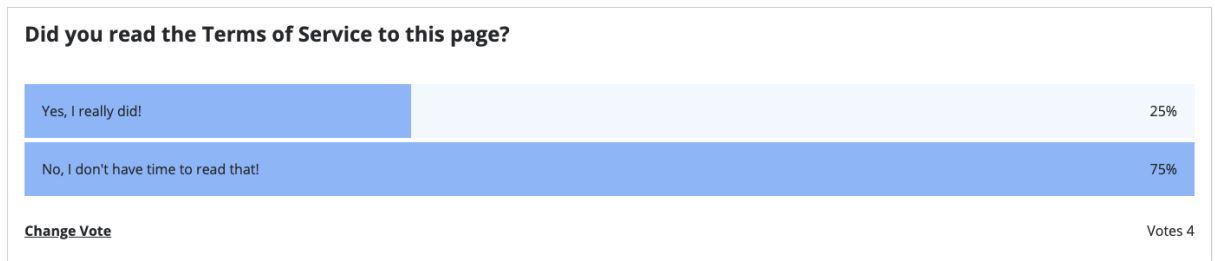
Improve this password

Finally, we wanted to refer back to the Terms of Service at the beginning of the visual by informing visitors to the tool to know what is inside a privacy agreement.

We ask visitors to anonymously admit whether or not they read the terms of this tool.

Know what you're agreeing to

Understanding the terms of service is important because it allows you to know what data the company is collecting from you, how they will use it, and who they may share it with. It might be impossible to fully understand the details of every terms of service, it is important to be aware of what is being collected and what rights you have to your data. Consider using tools, like CommonSense, to evaluate the safety and privacy of your data.



opinion stage - create your own poll

Example of Privacy Data Tool

It is no secret by now (especially after looking at your data, for you hopefully!) that data is collected on users by platforms online. We wanted to create a tool that users can understand what data is collected on them by companies and created a Tableau Dashboard and process that people can understand what is collected and how data is used. We first included a workflow on how visitors to our site can access their data from Netflix. This workflow changes colors for each step so that users can follow along and “check off” what steps that they have completed.

Netflix Data Subject Access Request Process

In order to use the below Tableau, dashboard to Analyze your Netflix Data you need to retrieve it first.

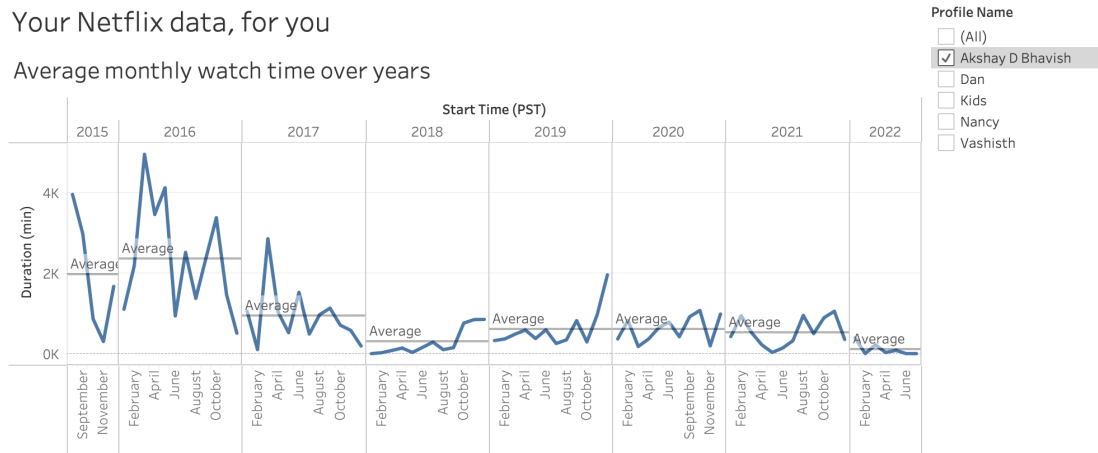


We present the information obtained by exercising the Data Subject Access Request with respect to Netflix in a Tableau dashboard. It is meant to be a simple illustration of the power of one's data: a time graph showing average watch time over the years, two Key Performance Indicators of titles watched and rewatched, and a histogram of watch times. Crucial to note is that none of these are proactively shared by Netflix to the user, yet they hold such powerful information that could persuade a user to perhaps change their habits. Here, presenting information and finding relations are two of the dashboard's key functions.

Note: the actual live site doesn't have this visual since it is based on actual data. For privacy, we uploaded dummy data in the workbook for the user to download; however, we share coherent actual data in this final report for the reader's benefit.

Your Netflix data, for you

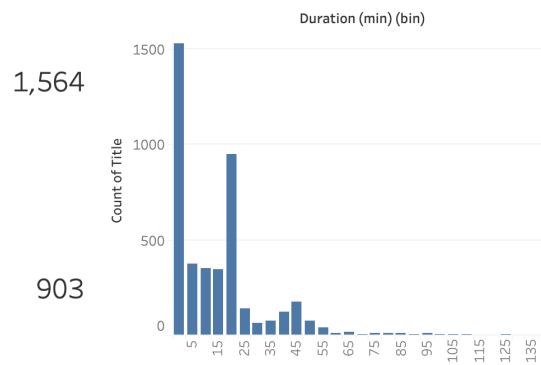
Average monthly watch time over years



How many titles do you watch?

Duration of watch time v/s frequency

How many titles do you rewatch?



Data used

Our data is sourced from:

- [Internet World Stats](#): We used this datasource to show how Internet use has increased over time and how important privacy has become.
- [Google Search Statistics and Facts 2023](#): We used this source to
- [Data Breaches by Information Is Beautiful](#): We used the dataset from Information is Beautiful in our scatterplot of how data breaches have increased and changed over time.
- [CommonSense](#): We collected and combined the scores and profiles of online platforms by CommonSense. We used this in our heatmap and our radar charts.
- Netflix Data Subject Access Request (module 3)

Tools used

We used a variety of tools for our project:

For Data Collection:

- [Typeform](#): We collected responses for our usability tests through Typeform.
- [Opinion Stage](#): We used this tool for the survey we embedded in our page.

For Design:

- Figma: Our brainstorming and early prototypes were done in [Figma boards](#).

For Data Visualization:

- [Observable](#): We used Observable for charts. Many of our early iterations of our site included Observable notebooks.
- [Flourish](#): We used flourish for our heatmap, line graph, and scatterplot.
- [Tableau](#): We used Tableau for the downloadable dashboard that we hope users can use to learn more about how Netflix collects and uses data.

For Icons:

- [Figma](#): We split our icons into two tools: Figma and Canva.
- [Canva](#): We split our icons into two tools: Figma and Canva.

For Animation:

- [Canva](#): We used Canva to create the gif animations throughout our visualization.

For Website Development:

- HTML and CSS: Our site was built on HTML and CSS

Usability and User Tests

We received feedback from our users throughout the project. We began with an initial user discovery exercise to establish what potential users would be interested in learning. We then conducted a formal usability test which helped us refine the visual artifacts of our project. Although we ran out of time during this project to conduct a formal endline test of our tool, we intend to continue to update and refine this tool in the future.

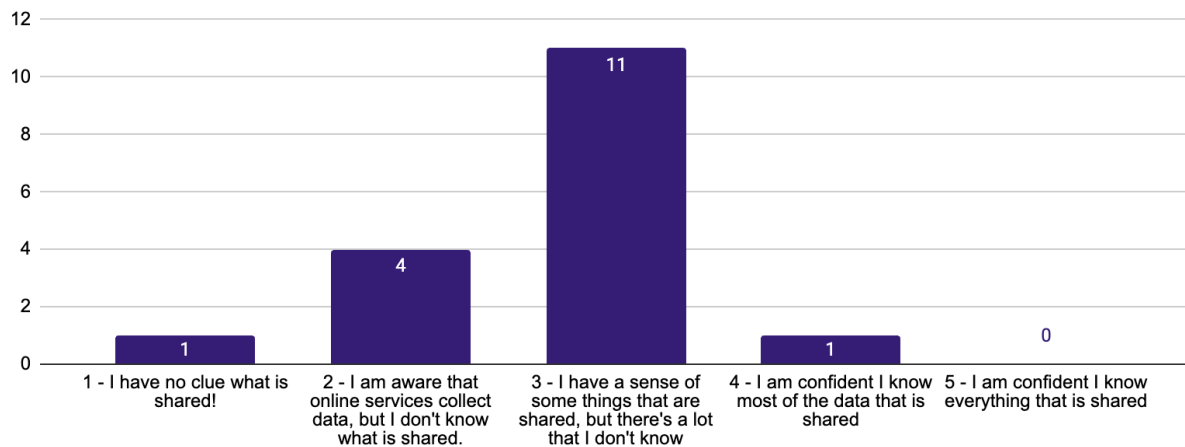
User Discovery

Before designing our tool, we conducted a user discovery survey with 17 respondents. We used the user discovery survey to scope and design our solution and content.

Results

We surveyed respondents about their confidence in understanding the information collected and shared by online platforms. The results showed that the majority of respondents are not fully aware of what is being shared by these platforms, indicating that there is a significant amount of information that remains unknown. We intended on using this question as a baseline to show how users' knowledge changed before and after visiting *your data, for you* changed.

How well do you feel you understand what personal data is shared with online platforms?



As part of our study, we asked respondents to submit 1-3 questions that they would like to have answered using the information collected from a service like Netflix. The responses showed that over 58% of the participants were interested in knowing more about how their viewing patterns change and how frequently they engage in binge-watching. These insights guided the design of our Tableau tool, which was tailored to address these specific questions.

Question	Number of Respondents
How does my viewing behavior change over the course of a week or month?	11
How often do I binge-watch content?	10
How long do I typically spend watching a single episode or movie?	8
How much time do I spend watching TV shows versus movies?	7
What are my most watched genres?	7
What time of day do I watch content the most?	6
Which actors or actresses do I tend to watch the most?	4
What items do I search for?	3
Do I watch more on a particular device?	2

Discussion

The survey results played a crucial role in determining the level of complexity in our project's content. With 94% of respondents indicating that they possess moderate to little knowledge about the data collected and used by online platforms, we decided to emphasize simplicity and accessibility as the core goals of our project. To meet these objectives, we designed our content to be easily understandable by everyone. We also included a section on "What do companies collect?" based on the responses we received from the survey to address the most pressing concerns of our respondents.

Usability testing

We performed usability testing to assess the performance of our visuals for the first two modules, which are key for our final project. The goal was to assess users' level of clarity and comfort with two components of *your data, for you*:

1. Privacy Score comparison

A component designed to allow easy comparison of privacy scores of different platforms (independently assessed by CommonSense)

2. Data Collection comparison

A component designed to allow easy comparison of the types of personal information collected by platforms (independently assessed by CommonSense)

We planned two sets of visuals for each component:

Survey \ Visual	First visual shown	Second visual shown
Privacy Score comparison (survey #1)	Radar chart (figure 1)	Bar chart (figure 2)
Data Collection comparison (survey #2)	Zoomable circle packing (figure 3)	Collapsible tree (figure 4)

We randomly assigned the participants to one of the two arrangements.

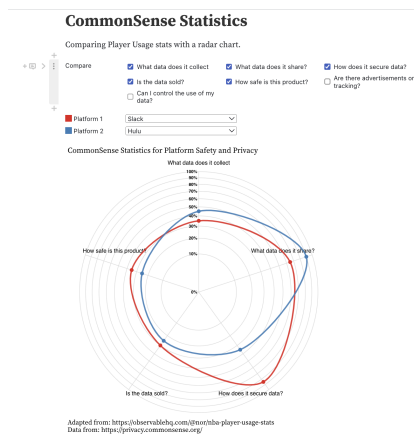
To evaluate the effectiveness of our designs for each component, we asked each participant to perform specific tasks while having them comment on the designs' clarity, strengths and weaknesses. Specifically the participants were asked to fill up a Typeform questionnaire, which included instructions and links to the designs.

Participants

We recruited six participants in total across Survey 1 (three participants) and Survey 2 (three participants); they were randomly allocated. The participants are not necessarily representative of the US population.

Results

Privacy Score comparison



Platform Comparisons

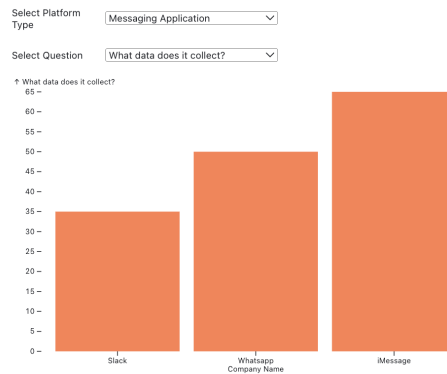


Figure 1

Figure 2

Quantitative scores

Figure	Visual type	Average ease of understanding (out of 5)	Number of people who thought it was easier to understand	Number of people who preferred chart
Figure 1	Bar chart	3.3	2	1
Figure 2	Radar chart	3.7	1	2

Our Likert scales for measuring ease of understanding showed that the radar chart was better, although that was not reflected in the specific question which asked to vote which chart was easier to understand (note though that the small sample size is prone to the influence of outliers).

Qualitative answers

Figure	Visual type	1-sentence chart meaning	Strength	Weakness
Figure 1	Bar chart	Mostly clear; respondents understood that it was to compare privacy scores	Bar chart is easy to understand	Axis meaning not clear Could use more colors
Figure 2	Radar chart	Mostly clear; respondents understood that it was to compare privacy scores	Allows for a combination of questions and scores to be compared	Axis meaning not clear Can only compare 2 platforms at a time

Respondents' qualitative observations suggested that they were able to understand the purpose of the two charts, which tallies well with their quantitative responses. For both, specific strengths and weaknesses were called out, such as the ability to compare multiple units, or the meaning of the axes.

Data Collection comparison

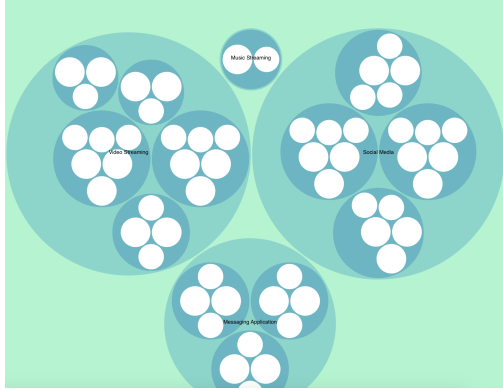


Figure 3

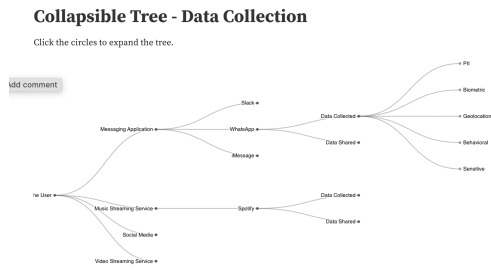


Figure 4

Quantitative scores

Figure	Visual type	Average ease of understanding (out of 5)	Number of people who thought it was easier to understand	Number of people who preferred chart
Figure 3	Zoomable circle packing	4.0	2	2
Figure 4	Collapsible tree	4.7	1	1

Similar to the privacy comparison responses, we see some dissonance in respondents' answers. Respondents graded the Zoomable circle packing chart (akin to a 'bubble' chart) as harder to understand, but preferred it in our vote. Again, the small sample size reduces validity.

Qualitative answers

Figure	Visual type	1-sentence chart meaning	Strength	Weakness
Figure 1	Zoomable circle packing	Mostly clear; respondents understood that it was to find the categories of	Interactivity Consistent visual language (use of white space)	Takes time to understand Identity of platform not

		information collected by platforms		clear
Figure 2	Collapsible tree	Mostly clear; respondents understood the listing of categories of info collected and the hierarchy implied by the tree	Interactivity Can see all categories at sight	Not easy to click or expand branches Hard to compare platforms' collection

Respondents observed that the two charts' intentions were clear: they were to enable the categorization of personal information being collected by platforms. For both, they appreciated the charts' interactivity. Specific room for improvement were mentioned as well, such as the time it takes to understand how to use the given chart.

Discussion

An overarching learning was that respondents like interactivity; they like to play around and test on their own. Focusing on clear, simple elements such as well-labeled axes, consistent color coding and good use of white space is highly appreciated, since respondents do not like to be left guessing on the meaning of a dimension. Finally, to our delight, respondents indicated interest in our privacy theme, with a few voicing out that "they didn't know that ___ type of data was being collected". This validated our choice of project (with the caveat that we have limited statistical significance).

What we implemented from the usability testing results

- We changed the Collapsible Tree/Zoomable Circle Packing to a Categorical Heatmap because the relationship is not hierarchical (this is specifically also addressing Marti's comment). Although the circles in the original visualization were different sizes, the size had no meaning. A heatmap does a better job of comparing categories across platforms, and while we did not have the ability to perform another usability study, preliminary feedback suggested better reception.
- We decided against using the radar chart, and went for a comparative bar chart where all platforms are listed at once where the user is able to filter down to the specific data collection question (e.g. 'is biometric data collected?'). We intend for this to tackle the issue of not being able to compare more than two for our initial

bar chart, and the fact that the radar chart becomes messy for interpretation with thirteen platforms (which is no longer a small multiple).

- We added explanations to the CommonSense scoring to improve the users' understanding.
- We provided a significant amount of context to our problem statement, rather than immediately presenting the user with comparison charts. This, we believed, would contribute to a stronger understanding of privacy risks and concerns; hence, the initial definition of privacy, timeline and why privacy matters section in our final product.

Team contribution

	Team member	Ian	Ameya	Akshay
Visual Components	Visuals for data breaches, privacy score comparison and data collection comparison	90%	5%	5%
	Tableau dashboard	0%	5%	95%
	Timeline	90%	10%	0%
	Flowchart	0%	90%	10%
	Widgets: animation	50%	25%	25%
	Iconography, site sketches	20%	80%	0%
Content	Literature review/law research	33%	33%	33%
	Site Text	50%	15%	35%
Usability and User Tests	User Discovery questionnaire creation	33%	33%	33%
	Usability questionnaire creation	70%	10%	20%

	Usability outreach and respondent management	20%	70%	10%
	Usability analysis	0%	10%	90%
Presentations and Reports	Report proposal, write-ups	40%	20%	40%