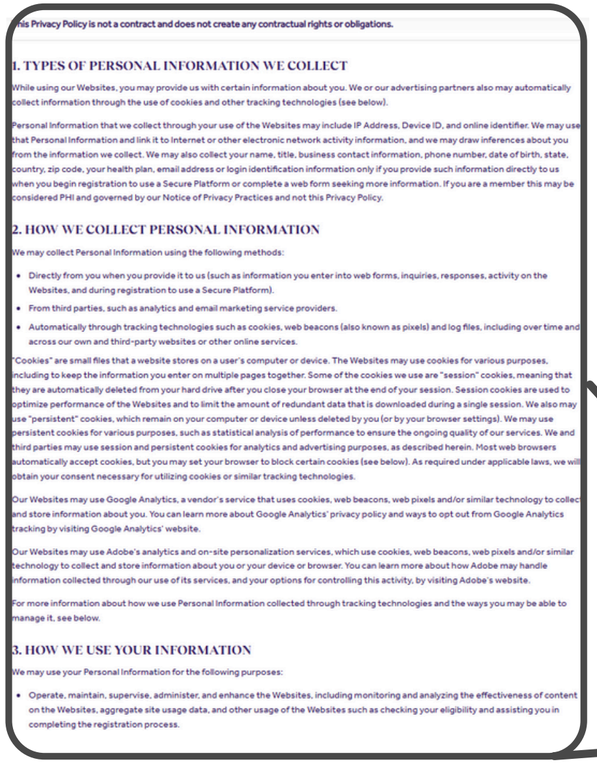
Transparency in Mobile Health

Human-Computer Interaction

Aug 2023 - Dec 2023

Professor: Dr. Seongkook Heo



his Privacy Policy is not a contract and does not create any contractual rights or obligations.

1. TYPES OF PERSONAL INFORMATION WE COLLECT

While using our Websites, you may provide us with certain information about you. We or our advertising partners also may automatically collect information through the use of cookies and other tracking technologies (see below).

Personal Information that we collect through your use of the Websites may include IP Address, Device ID, and online identifier. We may use that Personal Information and link it to Internet or other electronic network activity information, and we may draw inferences about you from the information we collect. We may also collect your name, title, business contact information, phone number, date of birth, state, country, zip code, your health plan, email address or login identification information only if you provide such information directly to us when you begin registration to use a Secure Platform or complete a web form seeking more information. If you are a member this may be considered PHI and governed by our Notice of Privacy Practices and not this Privacy Policy.

2. HOW WE COLLECT PERSONAL INFORMATION

We may collect Personal Information using the following methods:

- Directly from you when you provide it to us (such as information you enter into web forms, inquiries, responses, activity on the Websites, and during registration to use a Secure Platform).
- From third parties, such as analytics and email marketing service providers.
- Automatically through tracking technologies such as cookies, web beacons (also known as pixels) and log files, including over time and across our own and third-party websites or other online services.

"Cookies" are small files that a website stores on a user's computer or device. The Websites may use cookies for various purposes, including to keep the information you enter on multiple pages together. Some of the cookies we use are "session" cookies, meaning that they are automatically deleted from your hard drive after you close your browser at the end of your session. Session cookies are used to optimize performance of the Websites and to limit the amount of redundant data that is downloaded during a single session. We also may use "persistent" cookies, which remain on your computer or device unless deleted by you (or by your browser settings). We may use persistent cookies for various purposes, such as statistical analysis of performance to ensure the ongoing quality of our services. We and third parties may use session and persistent cookies for analytics and advertising purposes, as described herein. Most web browsers automatically accept cookies, but you may set your browser to block certain cookies (see below). As required under applicable laws, we will obtain your consent necessary for utilizing cookies or similar tracking technologies.

Our Websites may use Google Analytics, a vendor's service that uses cookies, web beacons, web pixels and/or similar technology to collect and store information about you. You can learn more about Google Analytics' privacy policy and ways to opt out from Google Analytics tracking by visiting Google Analytics' website.

Our Websites may use Adobe's analytics and on-site personalization services, which use cookies, web beacons, web pixels and/or similar technology to collect and store information about you or your device or browser. You can learn more about how Adobe may handle information collected through our use of its services, and your options for controlling this activity, by visiting Adobe's website.

For more information about how we use Personal Information collected through tracking technologies and the ways you may be able to manage it, see below.

3. HOW WE USE YOUR INFORMATION

We may use your Personal Information for the following purposes:

- Operate, maintain, supervise, administer, and enhance the Websites, including monitoring and analyzing the effectiveness of content on the Websites, aggregate site usage data, and other usage of the Websites such as checking your eligibility and assisting you in completing the registration process.

Teladoc Privacy Policy

Ajwa Shahid

University of Virginia

Project Workflow:

- Literature Review
- Defining Research Questions
- Preliminary Evaluation
- UI Design and Prototyping
- Usability Testing
- Analysis

The mobile health application we studied: Teladoc

My Role:

- Study Design
- UI/UX Research
- UI Design
- Usability Testing
- Data Analysis
- Report Writing

Skills and Tools:

- Figma
- Data Analysis (Qualitative and Quantitative)

Members:

Ji Hyun Kim, Sheharyar Khalid, JiHo Lee, Fitzgerald Marcelin

Motivation

There has been a recent trend in individuals using mobile Health (mHealth) applications. Statistics show that there are over 350,000 mHealth applications in major mobile application stores. With approximately **87 million people** in the United States having used a health or fitness app in 2020 [1], this number is only expected to increase [2].

A 2019 Pew Research survey shows that **fewer than 25% of U.S. adults** reported regularly or often reading privacy policies, while **36% stated they never read them** [3]. Prior work has also shown that mHealth apps share personally identifiable information with third parties over the network [4].

Why TelaDoc?

We selected "Teladoc" as the mobile health app for this experiment due to its large **number of downloads, positive reviews, and high rankings** in the iOS App Store and Google Play Store. Since the application was **cross-platform**, it removed the bias of different app usage practices amongst Android and iOS users. As a healthcare application, Teladoc is also subject to additional data privacy, sharing, and retention regulations, including compliance with the Health Insurance Portability and Accountability Act (HIPAA), which aims to protect patient privacy and security.

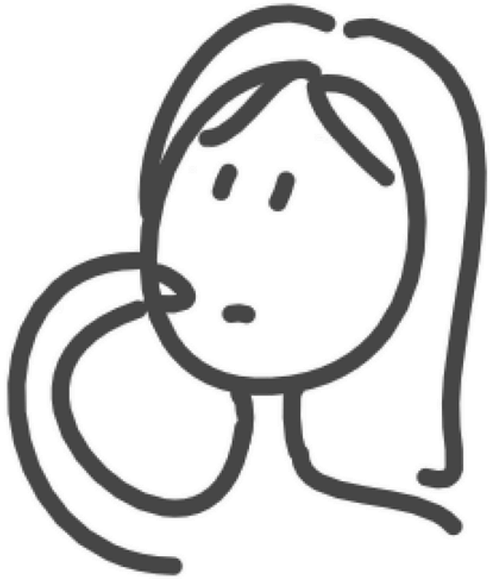
Desk Research

Current mHealth apps often **lack clarity** and transparency in how they handle user data, leading to ethical concerns and potentially uninformed consent. Consent forms are often **complex and difficult for users** to understand, hindering informed decision-making about data sharing.
Recognizing the need for a more user-friendly interface that enhances transparency and comprehension, our research aimed to address the following questions:

What are the most effective ways to enhance privacy preservation in mHealth apps, particularly regarding informed consent and transparency?

Which aspects of a redesigned interface contribute most to users' understanding of data usage?

How does a redesigned mHealth app influence users' consent decisions, if at all, compared to the original design, based on an improved understanding of data usage?



Desk Research

User data is often collected and shared with third parties for advertising purposes. The privacy policies of these mHealth apps are generally unclear, lacking transparency about what data is kept private, what is shared, and with whom. We divided this information into three main parts:

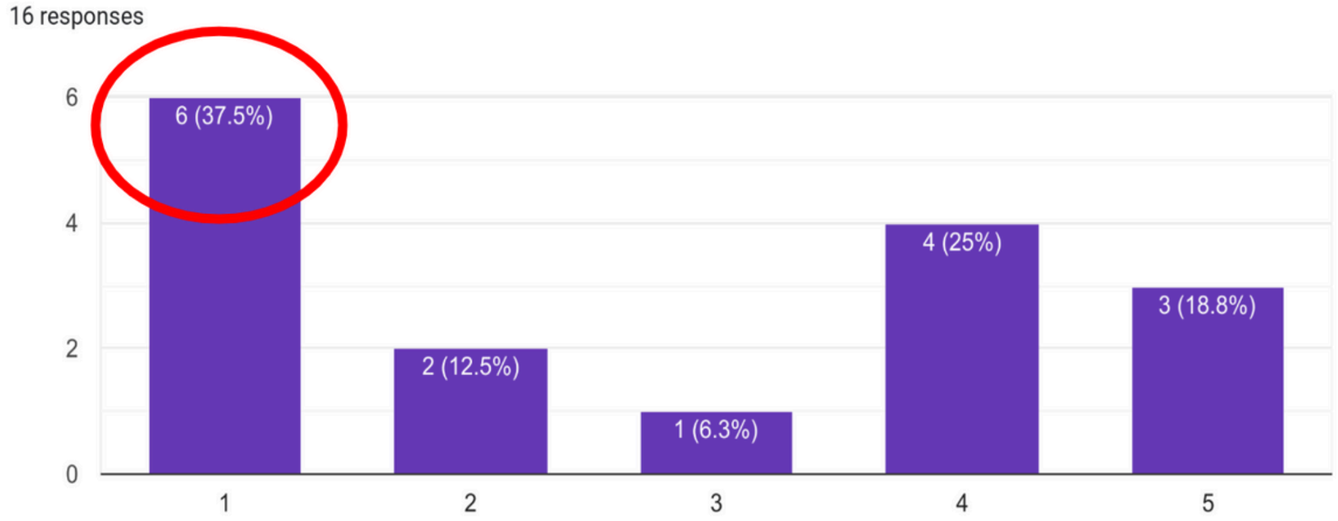
- **Data Sharing**
  - Personal data is shared with third parties.
  - Consent for data sharing is often vaguely covered in privacy policies.
- **Data Encryption and Security**
- **Data Deletion**
  - Few apps provide an option for users to delete their data.
  - There is a lack of clear policies regarding data deletion.

Preliminary Research

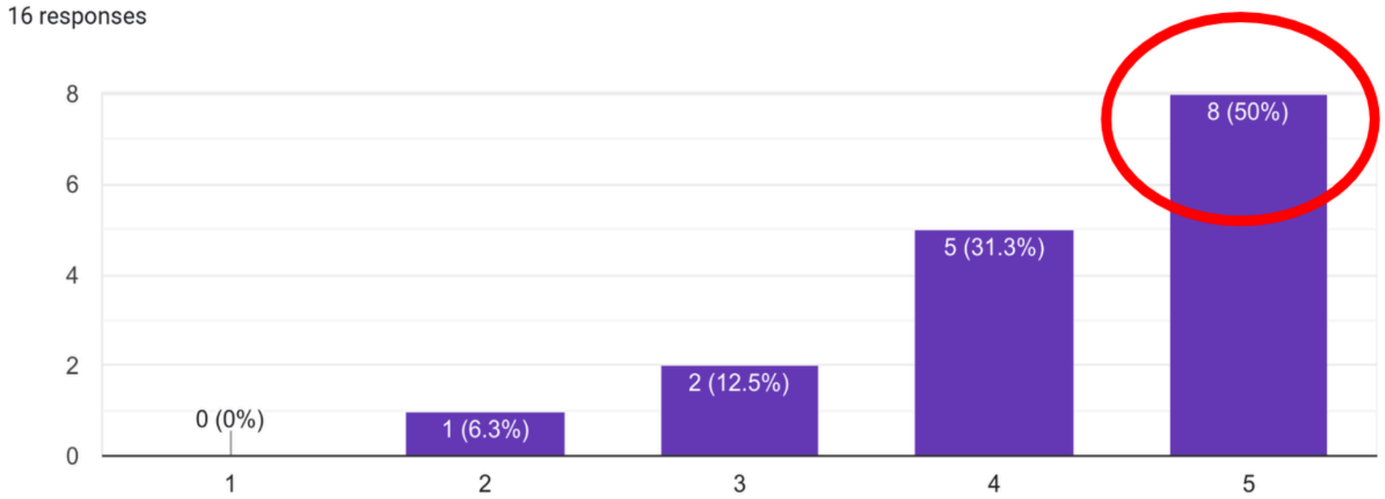
We conducted a preliminary study to gain insights into the current state of mHealth app consent forms and to understand user experiences and preferences. This online study used a Google Form with a mix of question types that I helped design, including 5-point Likert scales, multiple-choice questions, and both short and long open-ended responses. The survey was organized into three sections, as highlighted on the previous page, each aimed at capturing different aspects of participants' perspectives and behaviors regarding mHealth app consent forms.

We found interesting insights from the collected responses.

The design and layout of the consent form makes it easy to read.



How important is the design and layout of the consent form in influencing your decision to read it?



Participant Responses

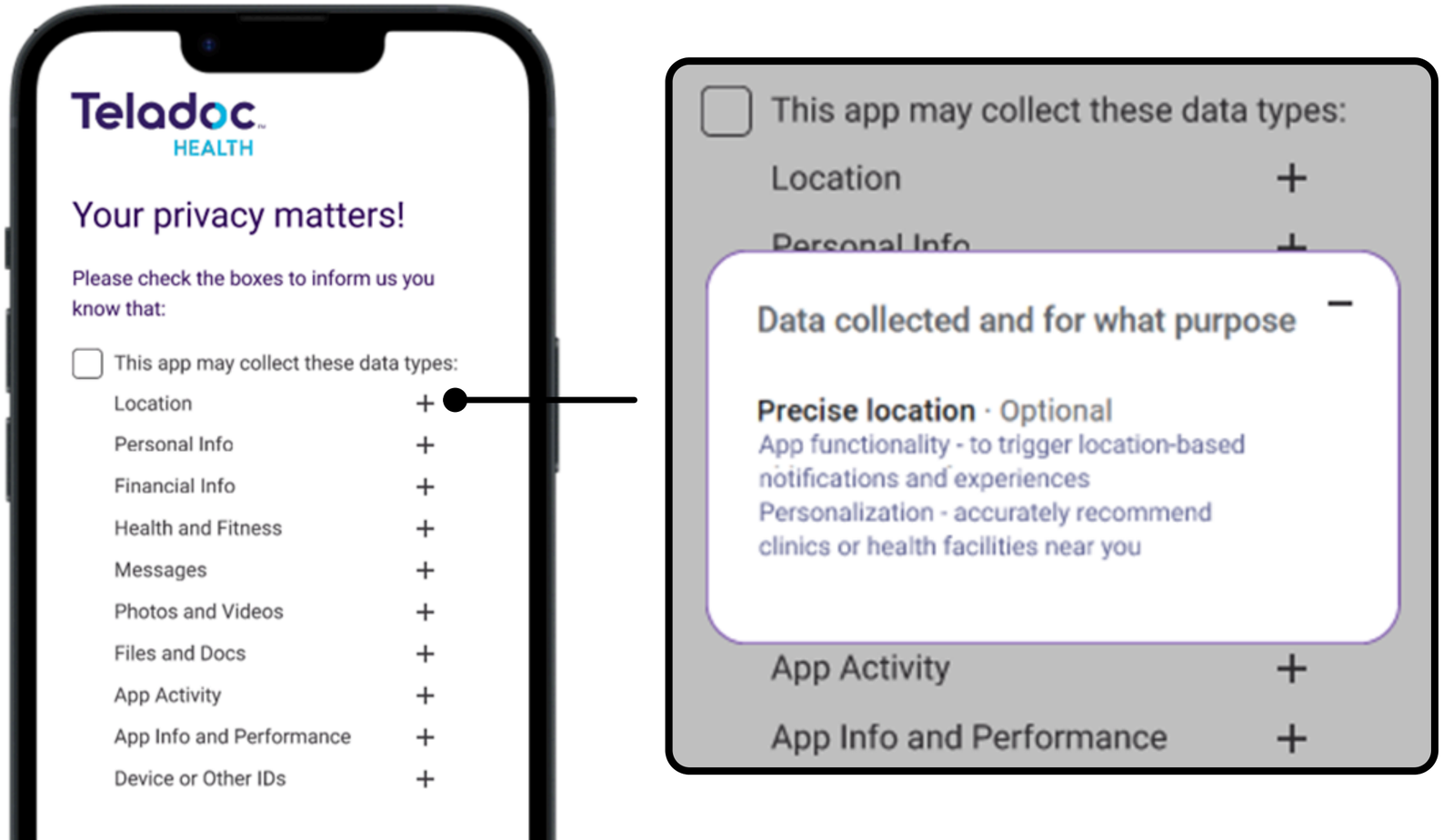
"Better text formatting, **clickable tabs** that expand/minimize"

"Digestible **bullet points** instead of longer blocks of text"

"**List format** rather than sentence after sentence"

Informed Design Decisions

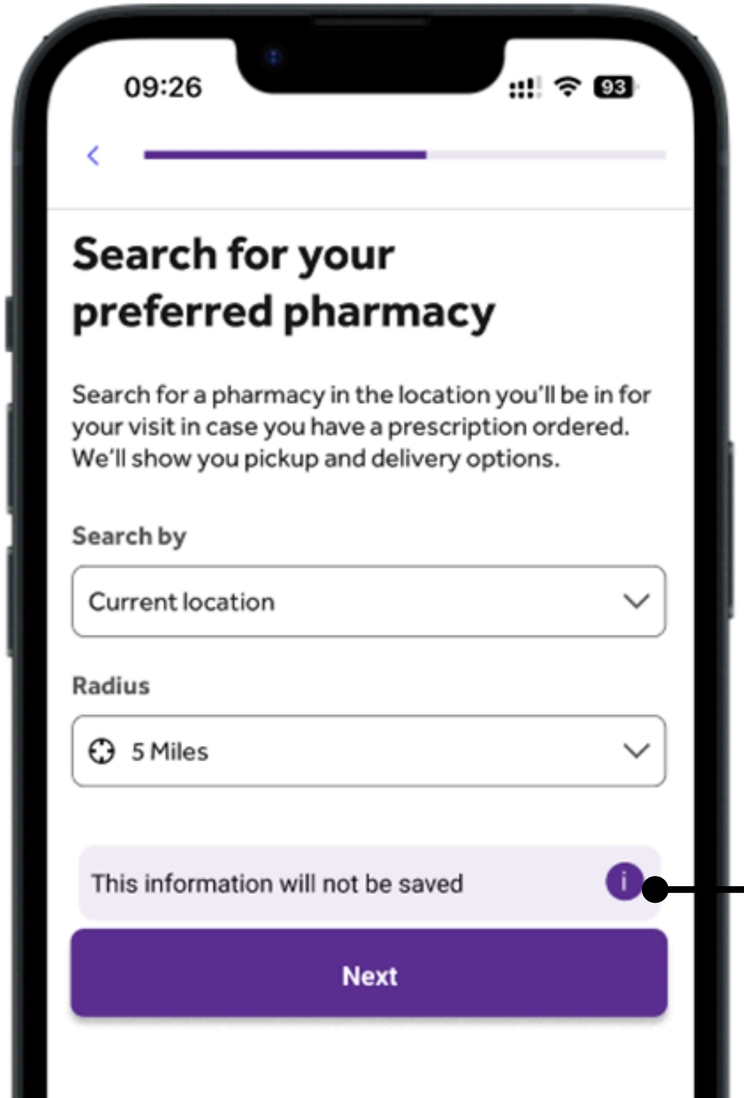
Based on the survey responses, I made some informed design decisions to improve the transparency and readability of the privacy policies in the mHealth application. This prototype was built using Figma.



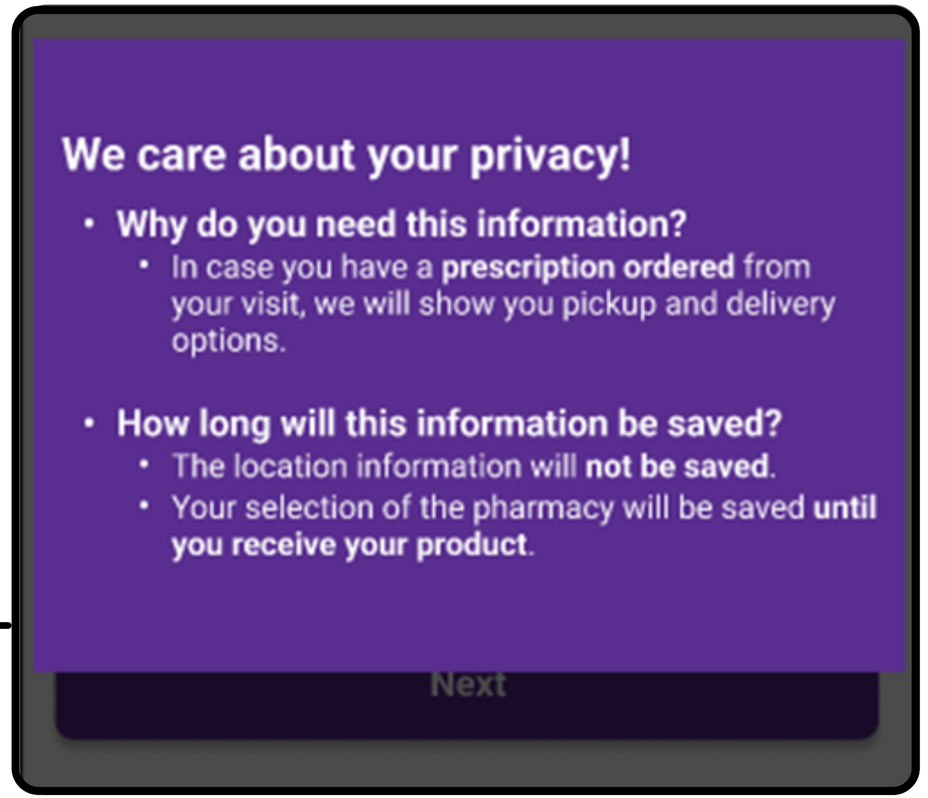
"Better text formatting, **clickable tabs** that expand/minimize"

Based on this common feedback I designed dropdown information sections that contains information about specific data being collected.

Informed Design Decisions

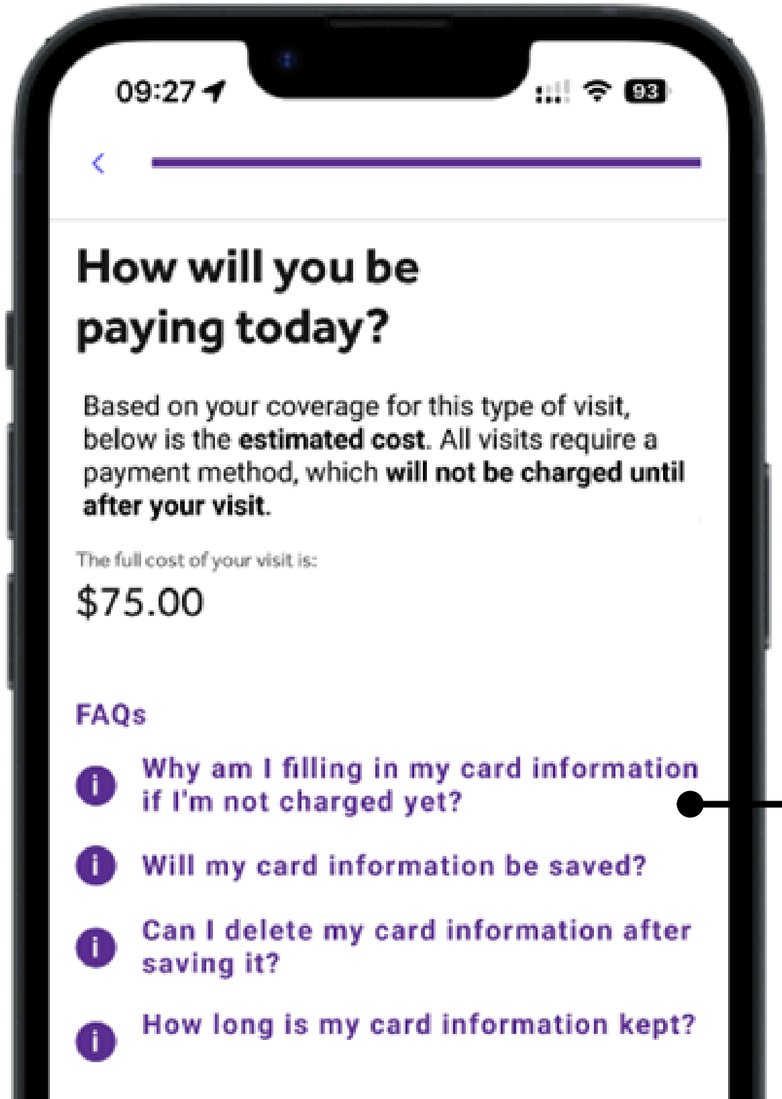


"Digestible **bullet points** instead of longer blocks of text"

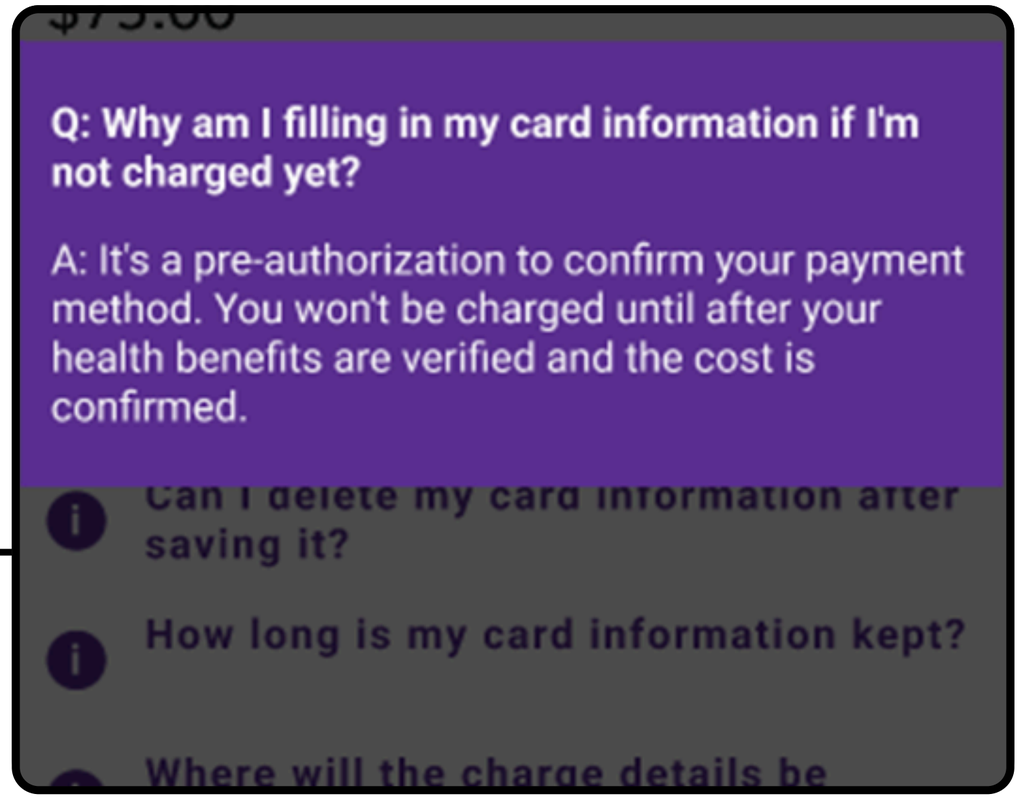


I added a message clearly showing what information will not be retained, and an info icon for details on why this data is being collected.

Informed Design Decisions



"**List format** rather than sentence after sentence"



Longer texts of information were broken down into relevant and relatable questions the users may have, and answers for each.

Redesign Evaluation - Within Subject User Study

Participants experienced both the original Teladoc app and our redesigned prototype but were divided into two groups, each following a different sequence to reduce bias from prior exposure. Using the Latin square method, one group started with the original app, while the other began with the prototype. I identified three key tasks on the Teladoc platform that required users to input personal information. To protect privacy, participants were instructed to use fabricated personal and medical data. After interacting with each app, participants completed quizzes and questionnaires to assess their comprehension and recall. To avoid bias, questions about new features in the redesigned prototype were asked only after all sessions were completed.

Attached is the Task Book that participants followed.

Check out our Prototype here.

Results - Quantitative Evaluation

The scores from the final Quiz Questionnaire were used for overall information retention comparison for the original and redesigned application. This Quiz asked the participants about the data policies spread throughout their use of the application.

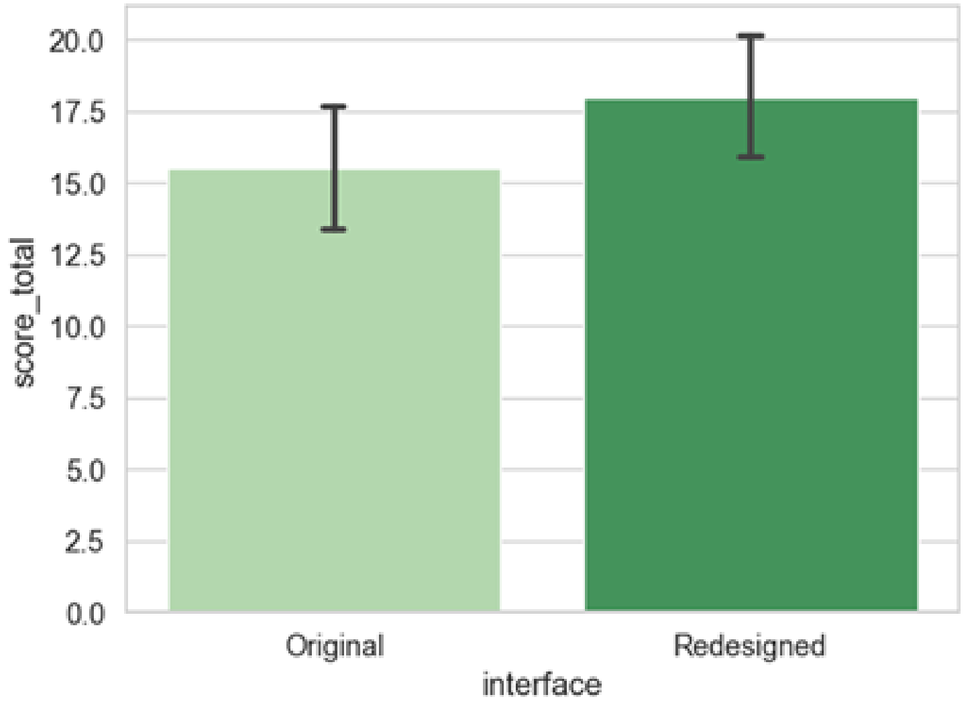


Figure 1: Total Score After Using Original and Redesigned Interfaces. Best score: 23

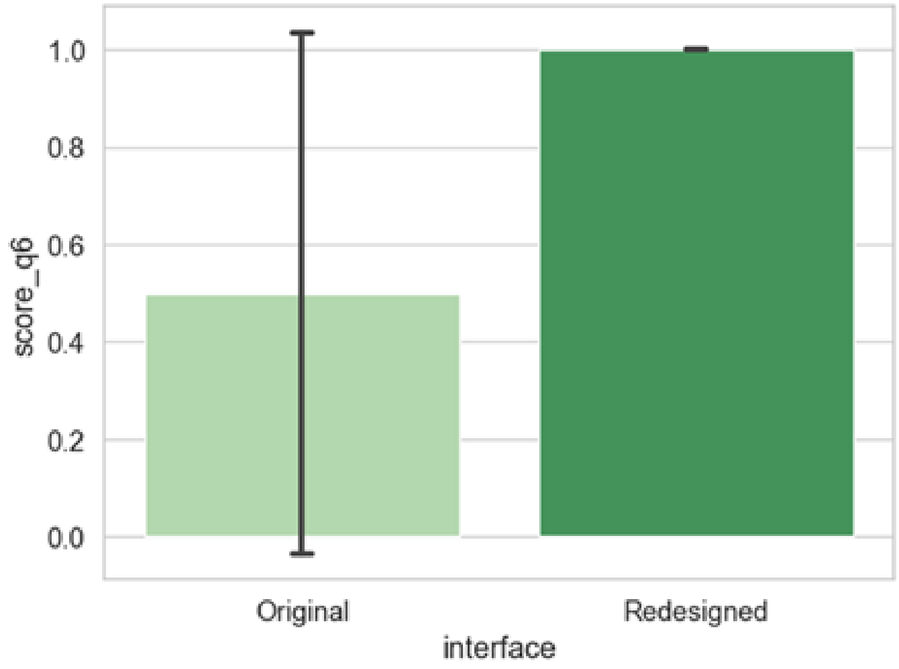


Figure 2: The result of qualitative questions (Q2, Q3, Q4) for who read or clicked the privacy policies. (Likert scale: 1~5)

Results - Quantitative Evaluation

The results highlight users are more likely to read privacy-related content in our redesigned mHealth application. Figure 4 shows how Readability (Q2), Transparency (Q3), and Understanding (Q4) also improved.

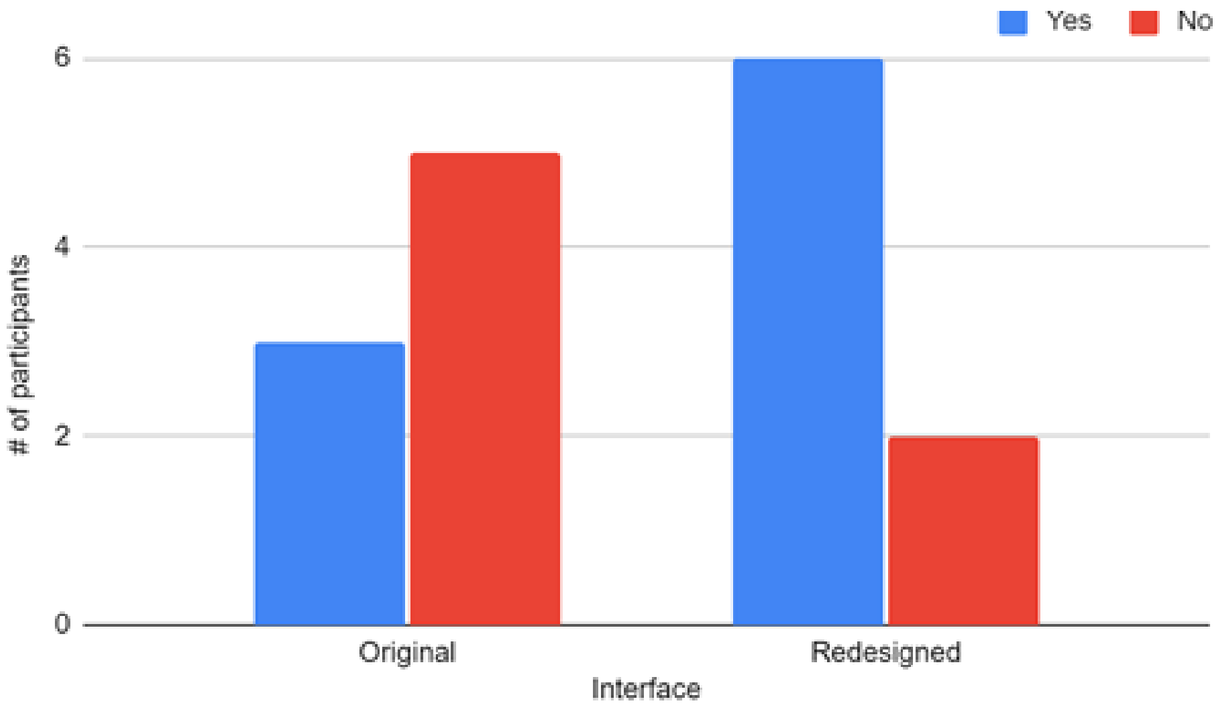


Figure 3: The number of participants who read/clicked privacy policies or not. (Yes or No)

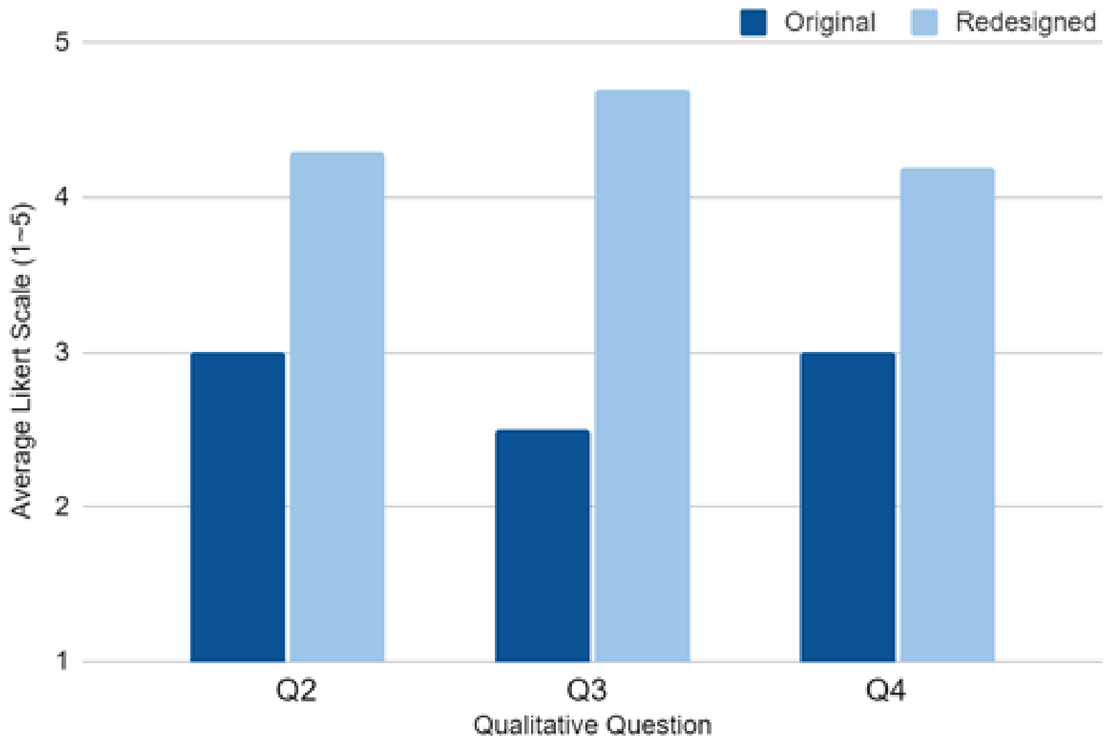


Figure 4: The result of experience questions (Q2, Q3, Q4) for who read or clicked the privacy policies. (Likert scale: 1~5)

Results - Qualitative Evaluation

We asked participants, who did not read the privacy policies in the original app, what might encourage them to engage with privacy-related content. Responses indicated a preference for clear, simple, and concise information.

Participant feedback

"Explain briefly about the policy"
"Shorter, more transparent explanations"
"concise text of policy"
"Main policies are presented and emboldened."

The number of participants who read the privacy policy when using our redesigned mHealth application doubled (figure 3). However, feedback still highlighted limitations in the redesign as well, with some participants noting "text too long," indicating further room for improvement.

Discussion

The study's findings emphasize the need for **developers to prioritize user-friendly interfaces** that enhance transparency in data handling, especially for mHealth applications dealing with sensitive information. Our results suggest that providing clear, concise, and accessible privacy policies can **significantly improve user trust and satisfaction**. Future research should investigate the long-term impact of these design changes on user behavior and assess the scalability of this approach across different types of mHealth apps.

Conclusion

Our study provides valuable insights into the effects of **interface redesign** on user comprehension and satisfaction in mHealth applications. The results indicate that the redesigned app **improved users' understanding** of privacy policies and data sharing practices, leading to **greater satisfaction** with the clarity of the information presented. These findings highlight the importance of user-centric design in enhancing privacy awareness within mHealth apps.

References

[1] Franklin, R. (2021, December 21). 11 Surprising Mobile Health Statistics. Mobius MD. Retrieved October 13, 2023, from https://mobius.md/2021/10/25/11-mobile-health-statistics/

[2] Phaneuf, A. (2020, July 20). The number of health and fitness app users increased 27% from last year. Insider Intelligence. Retrieved October 13, 2023, from https://www.insiderintelligence.com/content/number-of-health-fitness-app-users-increased-27-last-year

[3] Kelley, P. G., Bresee, J., Cranor, L. F., & Reeder, R. W. (2009). A"nutrition label"for privacy. Inproceedings of the 5th symposium on usable privacy and security(pp. 4:1–4:12). New York,NY, USA: ACM. doi:10.1145/1572532.1572538

[4] Atske, S. (2020, May 26). 4. Americans' attitudes and experiences with privacy policies and Laws. Pew Research Center: Internet, Science & Tech. Retrieved October 13, 2023, from https://www.pewresearch.org/internet/2019/11/15/americans-attitudes-and-experiences-with-privacy-policies-and-laws/

Disclaimer: All the cute illustrations in this portfolio were made by me.