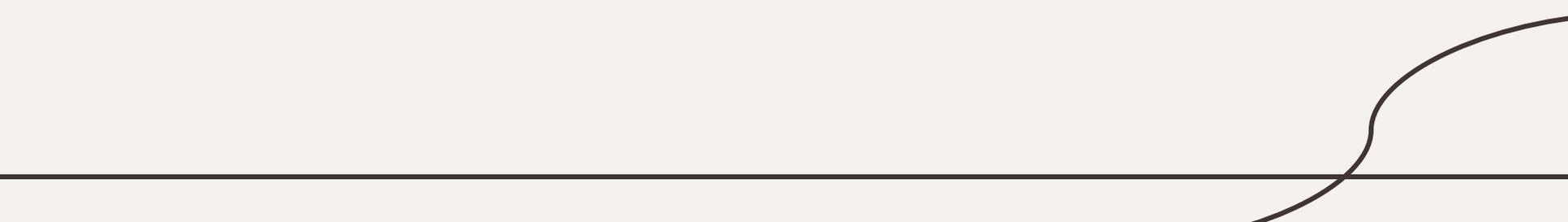


Low-Fi Prototype

Assignment 5

Medi-Pal: Siddhartha J, Douglas K, Nash Y



Team



Siddhartha J

Computer Science + Design



Douglas K

Computer Science



Nash Y

Biomedical Computation

Project Title and Value Proposition

Medi-Pal

Discover. Heal. Thrive.

Why Medi-Pal?

- Conveys a sense of friendliness and companionship
- Designed to be a 'pal' that guides through complexities of Medi-Cal: an always-available assistant that feels approachable

Why this value proposition?

- Helps users *find, truly understand, and leverage* Medi-Cal resources to improve health and well-being
- Unlike catalogs or resource databases, Medi-Pal takes a *proactive* approach in users' health

Problem + Solution

Problem

- Low awareness, confusion, and inaction due to complex Medi-Cal information and lack of personalized guidance
- Millions of low-income Californians qualify for Medi-Cal benefits but don't know where to start or how to access/leverage them
- Existing directories are overwhelming, hard to act on, and unintuitive

Solution

- Platform that helps users instantly find nearby Medi-Cal resources with clear contact and access details
- Personalized recommendations and reminders based on each user's needs, eligibility, and location
- More targeted and proactive than existing platforms: Medi-Pal actively nudges users instead of waiting for them to search + leverages voice/avatar AI to provide a human-touch

Outline of Talk

1

**Sketching
Explorations**

2

**Selected Interface &
Rationale**

3

**Low-Fi Prototype
Construction**

4

**Low-Fi Prototype Task
Flows**

5

Testing Methodology

6

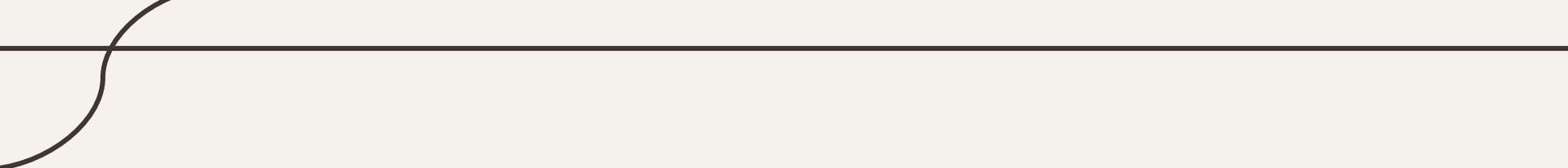
Testing Results

7

Discussion

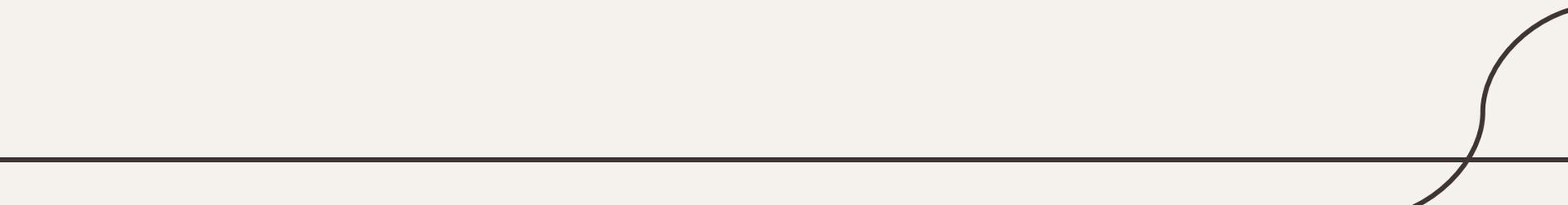
8

Appendix

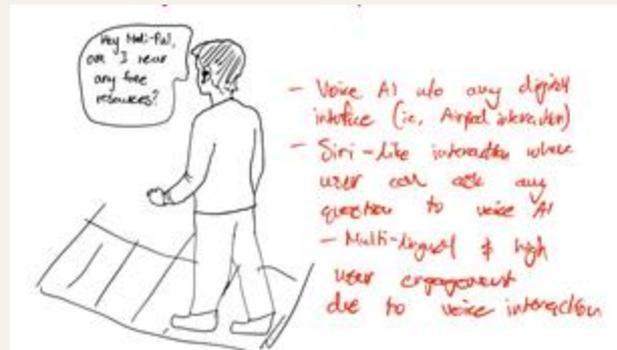
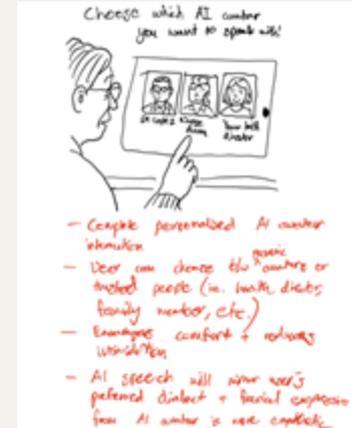
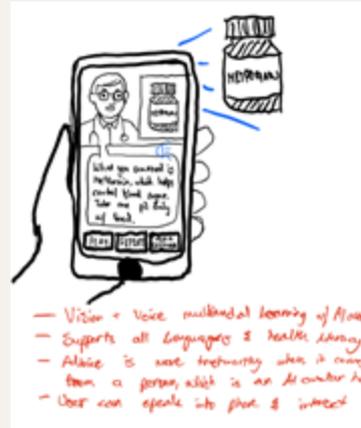
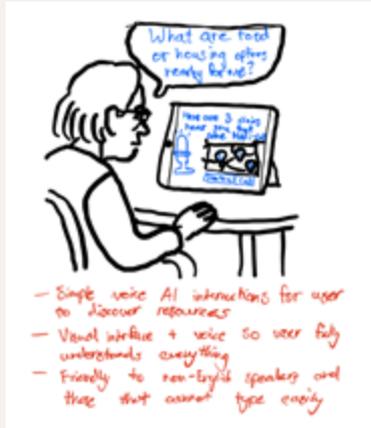


01

Sketching Explorations

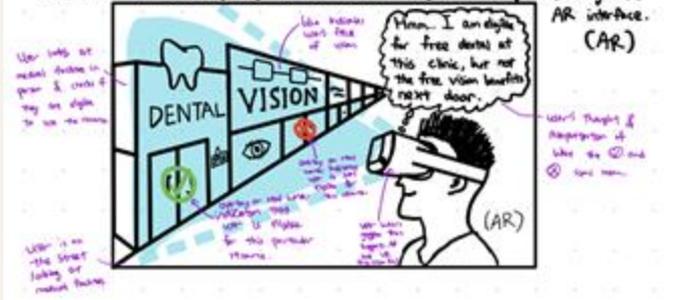


Concept Sketches - Modality #1: Voice + Avatar AI

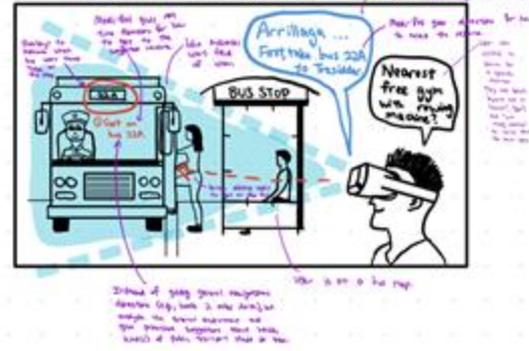


Concept Sketches - Modality #2: Extended Reality (AR+VR)

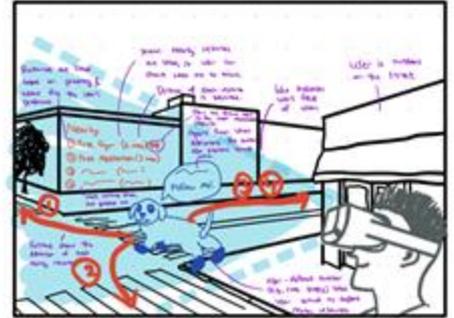
1. User checks eligibility for a resource they are looking at, through our AR interface. (AR)



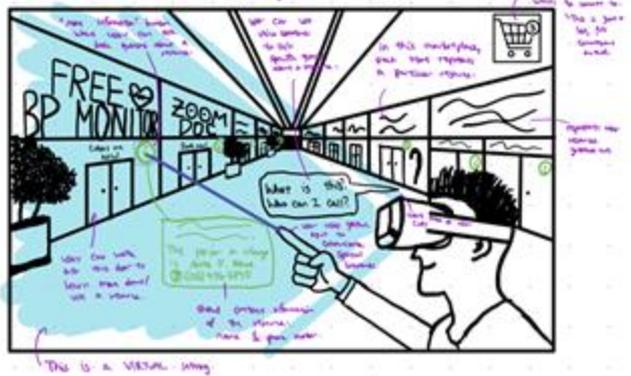
2. User searches for & locates a specific Medi-Cal resource. (AR)



3. User discovers nearby Medi-Cal resources. (AR)



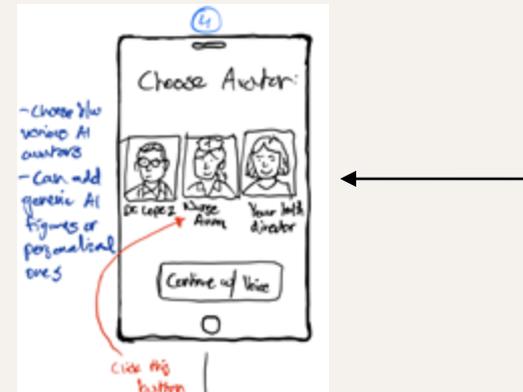
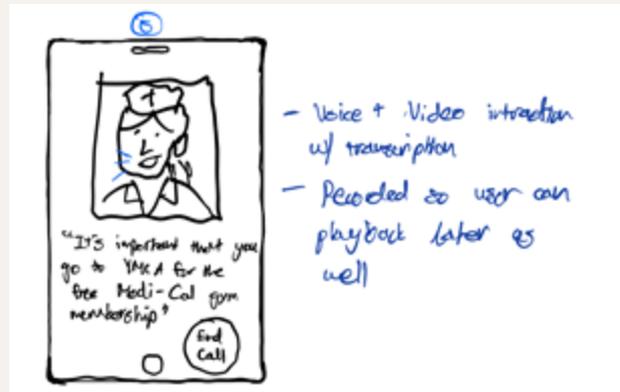
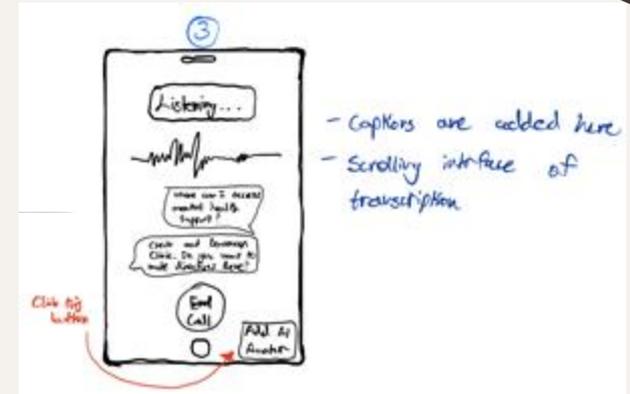
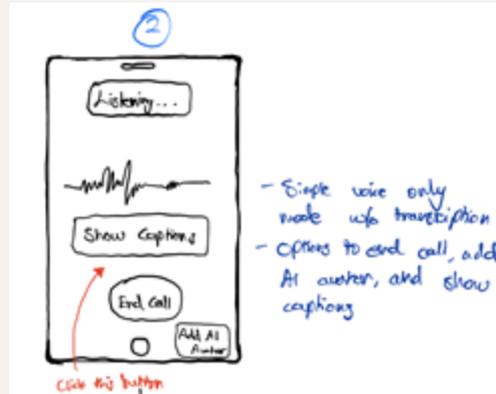
4. User previews free Medi-Cal resources & equipment in a virtual marketplace. (VR)



5. User plans out healthy lifestyle habits that leverage Medi-Cal resources together with an avatar. (VR)



Key Screens - Modality #1: Voice + Avatar AI



Pros & Cons - Modality #1: Voice + Avatar AI

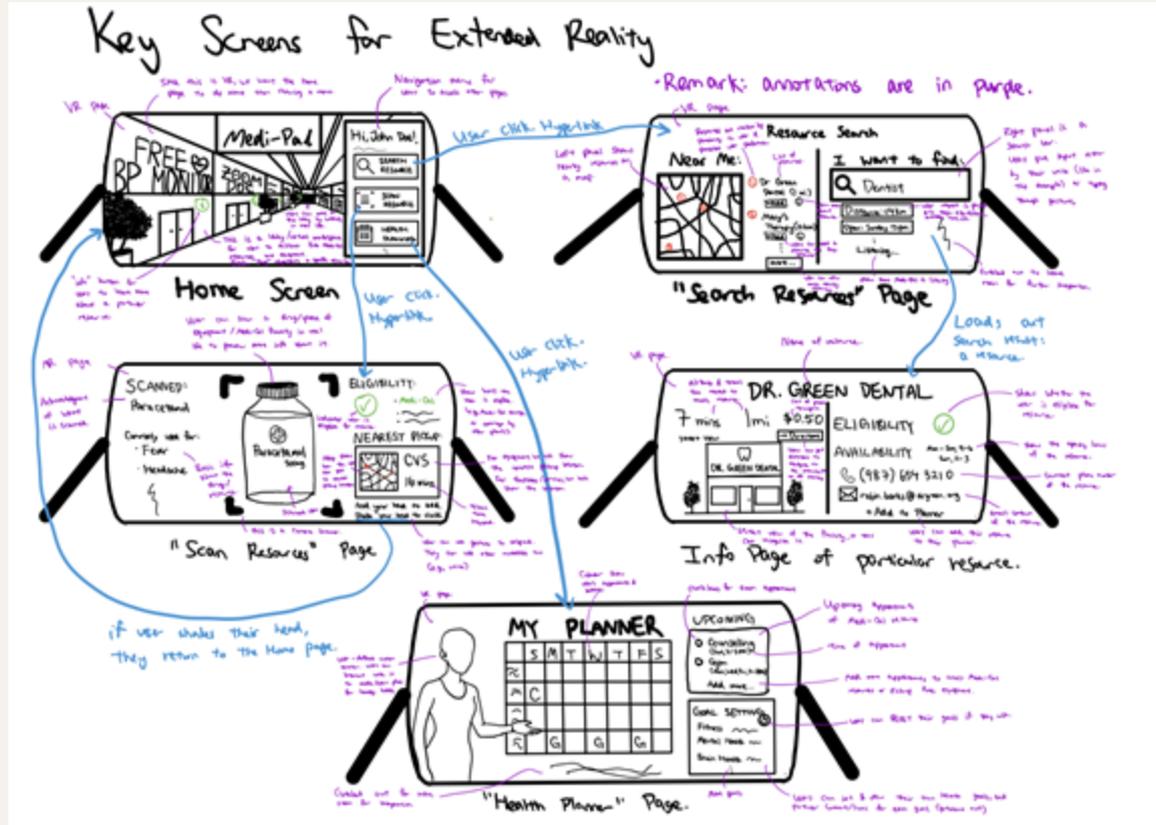
Pros

- **Accessibility:** removes literacy and complex UI barriers → people can speak naturally in any language and hear personalized answers
- **Trust & Engagement:** AI avatar + voice mimics a human helper (higher perceived empathy), which increases uptake and follow-through
- **Hyper-personalization of Information:** Voice dialogue allows for significantly more personalization since speech is more natural than typing

Cons

- **Hallucination Risk:** LLMs can hallucinate occasionally or give incorrect advice on eligibility or benefits → risk of losing trust
- **Technical Performance:** Voice & Avatar AI requires high-speed network coverage + cloud processing; speech interpretability sometimes falters as well
- **Cost:** LLM prices, especially with real-time avatar rendering, is quite expensive

Key Screens - Modality #2: Extended Reality (AR+VR)



Pros & Cons - Modality #2: Extended Reality

Pros

- **Immersive experience:** Users may enjoy browsing resources in a 3D environment more than scrolling through a list, as it feels more like an adventure than a chore. This would make users feel more engaged while using Medi-Pal.
- **Guided navigation:** Users would not have to read a map to view nearby resources or navigate to their desired resource. Instead, step-by-step navigation directions are shown directly within their view. This is extremely helpful for low-income and no-income users who may struggle with map literacy.
- **Hands-free interaction:** Users do not need to perform physical actions such as pulling out their phone to scan an object. This is particularly helpful for unhoused users who may be carrying a lot of items.
- **Emotional connection:** In our realization, we present virtual avatars that interact with users in 3D space. As these avatars appear in real-world environments through augmented reality, users may feel that these avatars are like genuine companions, and subsequently build trust and rapport with Medi-Pal.

Cons

- **Lack of familiarity:** Low-income and no-income populations generally lack experience with using extended reality headsets. There would be significant learning costs if users wish to use Medi-Pal through VR and AR headsets, as they would need to first learn how to use the headset.
- **Low digital literacy:** Low-income and no-income populations typically have lower digital literacy, and may feel reluctant to adopt technologies that they view as “fancy”.
- **Physical discomfort:** Wearing extended reality headsets for a long period may cause eye strain and discomfort. Users may also feel uncomfortable with wearing a headset in public. This may worsen some of their health conditions.
- **High costs:** AR/VR systems are financially inaccessible for our target users. One of our interview participants from Needfinding mentioned that he did not even have money to afford a regular T-Mobile phone plan. This suggests that our target users would not be able to afford AR/VR systems, which require monthly costs for purchasing headsets and high-speed internet connection.

02

Selected Interface & Rationale

Modality #1: Voice + Avatar AI

Why Voice AI + Avatar AI?

Barrier Reduction

Users that are low income and low digital literacy can access this tech easily

Trust & Empathy

Human-like voices and trusted AI avatar reduce anxiety for populations that traditionally distrust bureaucratic systems

Low Friction + Personalization

Users get instant, tailored guidance with minimal steps - voice interactions adapt to their language, context, and needs, reducing drop-off and increasing engagement

Feasibility, Scale, & Cost

Medi-Pal is entirely feasible to build with current technology and can also be deployed across devices, languages, and connectivity conditions seamlessly

Key Findings during User Interviews and Experience Prototyping

- 1) **User/UX constraints:** voice is highly preferred for low literacy, multilingual users
 - a) ~30% of interviewees preferred Spanish or other non-English languages

- 1) **Distrust & Confusion:** users strongly prefer personalized advice/recommendations based on their unique circumstance instead of one-size-fits-all solutions

- 1) **Decision Paralysis:** 7 interviewees felt completely overwhelmed by Medi-Cal resource databases → resulted in no decision being made

- 1) **Guided interactions:** users were significantly more likely to follow through on tasks when instructions were interactive, simple, and personalized
 - a) “I want to feel heard...” - User Interviewee

Solution Comparisons

Category	Voice AI + Avatar AI	Extended Reality	AI Drones
Technical Feasibility	★★★★★	★★★	★★
Accessibility for low-literacy users	★★★★	★★★	★★★
Scalability	★★★★★	★★★	★
Low Privacy and Regulatory Risks	★★★	★★	★
Accessibility for low-income users	★★★★★	★★★	★
User Adoption Likelihood	★★★★	★★★★	★★
Low Capital Intensity	★★★★★	★★★	★
Low Ongoing Operating Cost	★★★★★	★★★	★
Trust and Comfort	★★★★	★★★★	★★★
Personalization	★★★★	★★★★★	★★
Emotional Human-like Support	★★★★★	★★★★★	★★
Average	4.5 ★	3.5 ★	1.7 ★

Solution Comparisons (Detailed)

Category	Voice AI + Avatar AI	Extended Reality	AI Drones
Technical Feasibility	★★★★★ Easily implementable with existing speech and avatar tech using smartphones.	★★★ Requires specialized AR hardware and stable connectivity.	★★ Demands advanced robotics, navigation, and voice AI integration still in prototype stage.
Accessibility for low-literacy users	★★★★★ Natural speech and avatar interface removes reading barriers.	★★★ Visual prompts can help but device interaction may confuse some users.	★★★ Simple verbal commands work, but outdoor and noise interference reduce usability.
Scalability	★★★★★ Can be deployed instantly across mobile devices statewide.	★★★ Needs headsets or AR glasses, limiting reach.	★ Manufacturing and maintaining drones make scaling nearly impossible.
Low Privacy and Regulatory Risks	★★★ Moderate risk due to AI voice data storage but manageable via encryption.	★★ Visual data capture increases privacy concerns and HIPAA complexity.	★ Drone video/audio recording poses major legal and safety risks.
Accessibility for low-income users	★★★★★ Works on budget smartphones with internet or Wi-Fi.	★★★ Requires expensive AR devices and internet access.	★ High device cost and maintenance make it unrealistic for low-income communities.
User Adoption Likelihood	★★★★★ Familiar interface resembling virtual assistants like Siri or Alexa.	★★★★★ Novel and engaging, but device cost limits real-world uptake.	★★ Intrusive and socially awkward, reducing comfort and adoption.
Low Capital Intensity	★★★★★ Primarily software-based with minimal hardware needs.	★★★ Medium cost due to AR interface development.	★ Requires expensive drone units and sensors per user.
Low Ongoing Operating Cost	★★★★★ Cloud-based AI maintenance is cheap relative to physical devices.	★★★ Hardware servicing and updates are costly.	★ High upkeep and liability costs per device.

Solution Comparisons (Detailed cont.)

<u>Category</u>	<u>Voice AI + Avatar AI</u>	<u>Extended Reality</u>	<u>AI Drones</u>
Trust and Comfort	<p>★★★★★</p> <p>Conversational tone and familiar digital presence build rapport.</p>	<p>★★★★★</p> <p>Visual immersion can enhance empathy but feels impersonal to some.</p>	<p>★★★</p> <p>Physical proximity of drones may cause discomfort or fear.</p>
Personalization	<p>★★★★★</p> <p>Can adapt to user language, history, and medical needs easily.</p>	<p>★★★★★</p> <p>Immersive data and biometric inputs allow deep personalization.</p>	<p>★★</p> <p>Limited data processing for nuanced personalization.</p>
Emotional Human-like Support	<p>★★★★★</p> <p>Avatar expressions and empathetic voice provide warmth and reassurance.</p>	<p>★★★★★</p> <p>Realistic avatars and virtual spaces foster strong emotional connection.</p>	<p>★★</p> <p>Mechanized form limits emotional engagement and empathy.</p>
Average	<p>4.5 ★</p> <p>Most balanced and realistic solution combining empathy, scale, and cost-efficiency.</p>	<p>3.5 ★</p> <p>Technically exciting but limited by accessibility and cost barriers.</p>	<p>1.7 ★</p> <p>Conceptually futuristic but infeasible for real-world deployment.</p>

03

**Low-Fi Prototype
Construction**

Prototype Construction

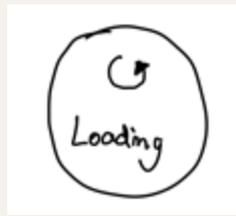
- Fully hand-written, printed, and displayed in front of interviewees to simulate the flow and structure of platform
- **Prototype included:**
 - Interactive elements such as page under construction messages, voice-mode activated icons, loading icons, and keyboard typing animations
 - Simulated voice interactions: Users could “speak” their needs and see corresponding visual cues on paper/mock screens.



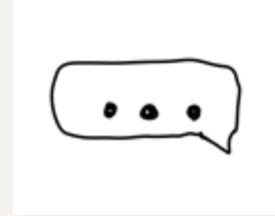
Under Construction



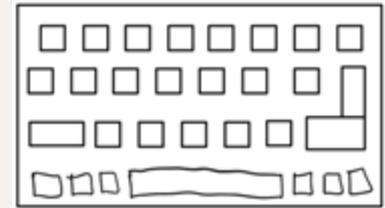
Speaking...



Loading Icon



Typing...



Keyboard

Key Decisions

We viewed the testing process as a valuable opportunity to collect data, and have made the following key decisions:

Text vs Voice Input

For each AI chat box, we deliberately let users **choose between text or voice**. This helps us learn about our users' **input preferences** and informs whether we should **prioritize visual or auditory** interaction.



Users choose between typing or voice input.

Early Testing of Advanced Feature

We **intentionally made** our moderate **task** of proactively finding resources **more complex** by asking users to upload a document instead of using a standard interface. We did this because we wanted to evaluate **how users interacted with advanced multimodal search features** that they were less familiar with, **instead of simple search functions** that are likely intuitive and unlikely to give us meaningful results.



In our moderate task, users search for resources by scanning a document instead of a search bar.

Chat vs Avatar

For our complex task of interacting with AI, we let users choose between regular AI chat or talking to an avatar. This will help us decide if we should **prioritize our efforts** on improving the avatars or refining the chat interface.



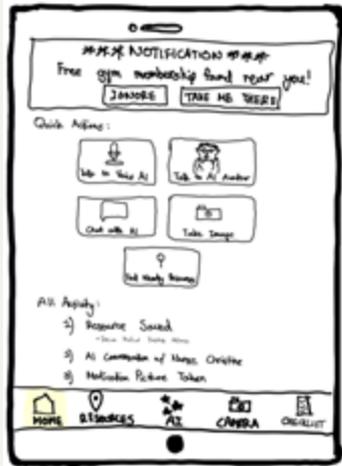
Users choose between regular chat and avatars for multiple occasions.

04

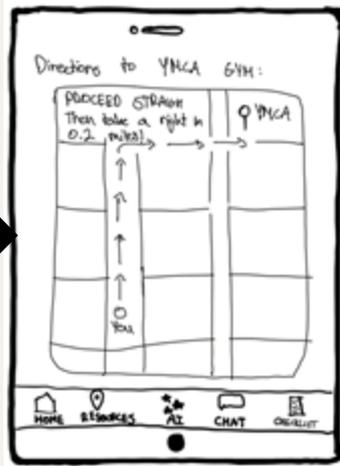
**Low-Fi Prototype Task
Flows**

Task Flow: Simple Task

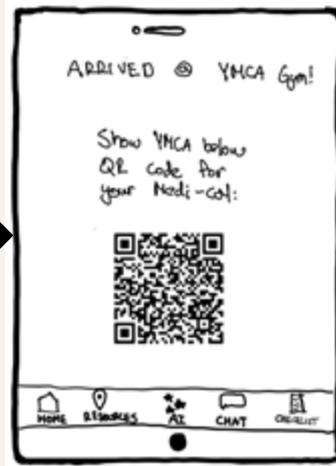
User to interact with an AI-led notification that prompts them to get a gym membership.



User receives an AI-generated pop-up notification



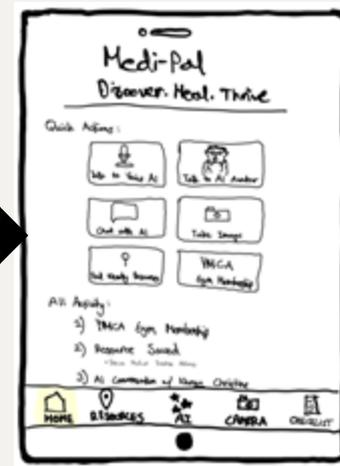
User sees directions to gym after accepting notification



Platform provides user's Medi-Cal QR code for gym membership purchase



Platform retains gym membership in database for future use



Task successfully completed and activity is updated on home screen

Task Flow: Moderate Task

User to use Medi-Pal to understand confusing medical notes from a recent respiratory appointment.



User arrives on home page



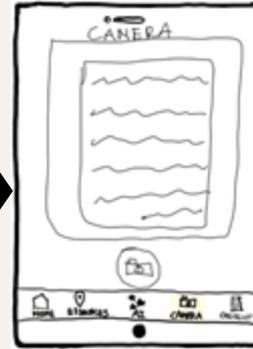
Navigates to resources tab and hits the "Discover New Resource" or "AI" button



User begins chat with the AI via voice or text



User requested to upload picture of notes



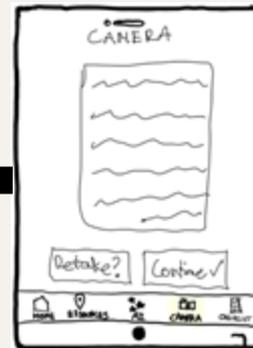
Task complete



AI ads prescription pick-up to user's schedule and will remind them later



AI analyzes uploaded notes and informs the user



User confirms image upload

Task Flow: Complex Task (Avatar flow)

User to chat with Voice or Avatar AI to develop a personalized asthma improvement plan.



User arrives on home page



User navigates to the AI tab to complete task and selects AI avatar mode



User selects desired AI avatar and begins chat with them



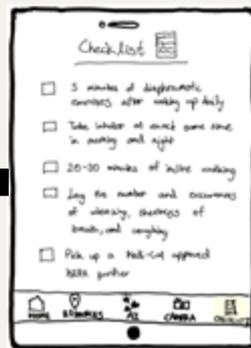
AI avatar provides personalized checklist



Platform logs the activity in history



User can check off completed tasks



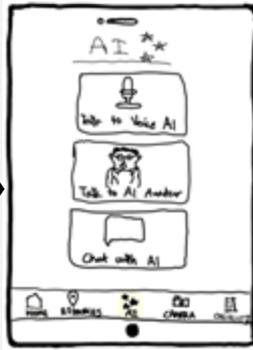
AI creates a checklist in tab for user

Task Flow: Complex Task (Voice Only Flow)

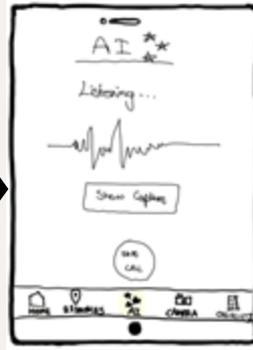
User to chat with Voice or Avatar AI to develop a personalized asthma improvement plan.



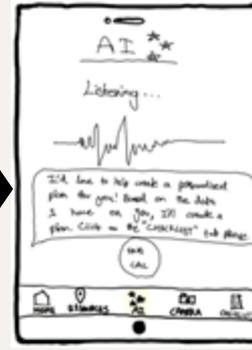
User arrives on home page



User navigates to the AI tab to complete task and selects voice only mode



User begins voice conversation with AI



AI created a checklist for user in the checklist tab



Platform logs the activity in history



User can check off completed tasks

05

Prototype Testing Setup

Participants



Demographic

- Participants were primarily low-income and unemployed members recruited at the East Palo Alto public library
- Age range spanned from late 20s to mid-60s
- Digital literacy varied widely - some were comfortable with smartphones and online videos, while other struggled with basic interface conventions. This was a key dimension we wanted to test amongst our target users



Recruitment Method

- Participants were approached in the library, framed as a quick 5-10 minute usability test to help improve a community-focused health resource prototype
- Recruitment relied on direct in-person outreach
- No prior relationships or pre-screening (authentic encounters with real-world users)
- Participation was voluntary and opt-in, we made it clear through our consent form

These participants match our core target persona: **low-income** individuals with Medi-Cal coverage who have **access to public spaces** but **not always clear on health guidance**

Participants

Digital Literacy



Quinn



Ryan



Polly



Kevin

Low Digital Literacy

High Digital Literacy

User Interviewees:

- Kevin: Unemployed 29 year old man, has Medi-Cal coverage, formerly a web designer
- Polly: Unemployed 34 year old woman, has Medi-Cal coverage
- Quinn: Retired 72 year old woman, has Medicare coverage
- Ryan: Unemployed 40 year old man, has Medi-Cal coverage

Testing Environment



~~Peninsula Healthcare Connection~~

- We originally planned to conduct testing with unhoused residents through Peninsula Healthcare Connection.
- However, the **facility was closed** for maintenance during our scheduled testing window making direct access to this population unavailable



East Palo Alto Public Library

- Because of this unforeseen circumstance, we pivoted to testing at the East Palo Alto public library, which still allowed us to connect with lower income individuals who reflect key characteristics of our target users, but not exclusive to individuals currently experiencing homelessness.



Image of our testing location.



Setup: Participants sit on a table with our prototype. **Facilitator sits next** to the participant to build rapport, the **Computer and Notetaker sit across** (not seen in camera). We sat at the edge of the library to prevent disturbing other people inside.

Testing Procedure

- 1. Introduction:** What we were testing and who we are
- 2. User Interface:** Show participant the first screen in which they will be interacting with for the prototype
- 3. Tasks:** State the first task they must complete
- 4. Execution:** Allow the user to work through the tasks with minimal help
- 5. Repeat** Steps 3 and 4 for the second and third tasks.
- 6. Feedback:** Asked participants for thoughts on the prototype and potential areas of improvement



Team Member Roles



Siddhartha J

Greeter, Note-taker



Douglas K

Computer



Nash Y

Facilitator

Usability Goals and Key Metrics

Learnability

(Evaluated across each task)

- **Reason of inclusion:** Indicates whether users can understand our system and learn how to use it. This usability goal is closely related to “ease of use”, but focuses on first-time user experience and identifies possible learning barriers to accessing Medi-Pal. Learnability is important because Medi-Pal is positioned as an accessible alternative to complicated existing solutions. If users struggle to learn how to use Medi-Pal, this would mean that our platform does not deliver value to its users.
- **Metrics:** Number of errors made, number of explanations needed for completing tasks
- **Rationale of Metrics:** If our interface is easy to learn, users would make minimal errors and require minimal external help to complete their tasks. Apart from testing whether users can easily learn how to navigate our prototype, these metrics also reveal which parts of our prototype are confusing and need modification.

Efficiency

(Evaluated across each task)

- **Reason of inclusion:** Indicates whether users can quickly accomplish their tasks with Medi-Pal. This is particularly important because Medi-Pal is typically used for finding specific resources (i.e., our simple and moderate tasks), which users expect to complete with minimal time and effort. If Medi-Pal is slow or requires too many steps, users would become impatient and discouraged from exploring Medi-Cal resources, meaning that the platform would fail to achieve its intended purpose.
- **Metrics:** Task completion time. (Number of errors is also a valid measure of efficiency.)
- **Rationale of Metrics:** Task completion time gives us an overall sense of whether users can accomplish tasks quickly. The number of errors, which is a learnability metric, can also help us identify specific parts of our prototype that slow down users.

Usefulness

(Evaluated once for the whole app)

- **Reason of inclusion:** Medi-Pal is only valuable if users actually find it useful for their everyday life. This usability goal is crucial for determining whether Medi-Pal should exist.
- **Metrics:** Self-reported score out of 10 for the questions “Would you use this?”
- **Rationale of Metric:** Although these scores are self-reported, they give a sense of whether users perceive Medi-Pal as relevant to their needs. These scores also give us an opportunity to ask further questions about why users perceive / do not perceive Medi-Pal as useful, which is a qualitative insight that other quantitative metrics could not reveal. As testers may inflate these scores to be polite, success in this criteria would mean scoring above 8/10.

06

Prototype Testing Results

Task #1: Bottom-Line Data

	Kevin	Polly	Quinn	Ryan	Avg.
No. of errors	3	2	2	3	2.5
No. of explanations needed	1	0	1	1	0.75
Task completion time	3:41	2:01	1:54	2:19	2:29

Key Takeaways: For a simple task, users took quite a bit of time and made some errors. Apart from finding the pop-up notification, which caused the majority of explanations (i.e., 2 out of 3), users were generally able to navigate through the task smoothly.

Task #1: Critical Incidents Log

User	Incident	Positive/ Negative	Severity	Possible Mitigation
Kevin	Ignored pop-up notification for nearby resource multiple times because he thought it was an advertisement.	Negative	4 - Usability Catastrophe	Add Medi-Pal's logo to notification or place notification at bottom
Quinn	Did not notice the pop-up notification for the nearby resource.	Negative	3 - Major Usability Problem	We may need to make the pop-up notification bigger or use bolder colors
Polly	"Will the map [directions to the nearby resource] talk to me when I put it on a bicycle?"	Negative	1 - Cosmetic Problem	We plan to have a voice feature for our map, but did not prioritize it in our low-fi prototype
Ryan	Initially clicked "Chat with AI" to learn about new resources instead of the intended "Find Nearby Resources" button*.	Negative	1 - Cosmetic Problem	Give users multiple options to complete the same task

***Remark:** Although users usually just get notified about nearby resources, we made users click the "Find Nearby Resources" button at the start to setup the notifications system.

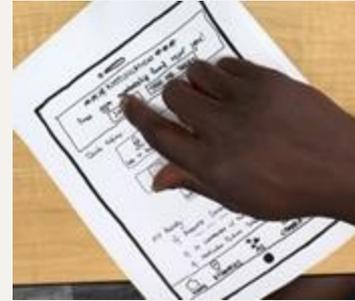
Task #1: Additional Observations

Pop-up was not obvious

Multiple users did not notice the pop-up notification until we showed them the before-and-after screens side by side. The notification size positioning was not obvious - Kevin suggested us to shift the notification to the bottom and make it bigger.

Enjoyed the map and directions

Multiple users explicitly pointed out that they appreciated having a map with directions when they were navigating to nearby resources, as it made the experience of traveling to a new location more intuitive. This suggests that we should keep the feature in future iterations.



Kevin ignores the pop-up notification



Kevin's explanation

Preference of using AI

At the start of the task, some users surprisingly chose "Chat with AI" instead of engaging with other buttons on the home screen. This suggests that reading the menu requires cognitive effort, and indicates that we may need to use AI to provide signposting for users.



Despite there being a "Find Nearby Resources" button in the main menu, Ryan chooses "Chat with AI" to find nearby resources instead of pressing that button.

Task #1: Discussion and Key Insights

Usability Goals

Reason

Key Takeaways

Most parts of the task flow were **learnable**.



Most parts of the task flow did not require any explicit user input, as the screen would change depending on their location. Though, some navigation-related features could **not** be **meaningfully tested** as it was not feasible to walk around the library.



Clearly, there is no learning barrier if minimal user input is required, so this task is **not a meaningful indicator** of our app's learnability. Further testing will be necessary, as learnability issues may arise when users actively engage with the app in **real-world tasks**, such as following map directions outdoors, **rather than fictional scenarios**.

Efficiency can be further enhanced.



One user took longer than intended because he used a task flow that was **valid** (i.e., clicking "chat with AI" instead of a menu button), **but not supported** by our prototype.



Home buttons were previously viewed as simple. Nowadays, it seems like users find chatting with AI **more effortless than navigating buttons** on a home screen because natural language input allows them to express their needs explicitly without having to scan through multiple options.

Pop-up notification was a severe hindrance to **learnability** and **efficiency**.



Users were **confused by the layout design**: the "Get Nearby Resources" button was positioned near the bottom, while the resulting notification appeared at the top. Users failed to connect these two elements as they were too far apart.



The application of **Gestalt principles** (e.g., related items should be near each other) can help users understand how to use Medi-Cal on their own. This also helps users develop familiarity with Medi-Pal, which improves task efficiency.

Our app provided **useful** features to help the user accomplish their task.



Several users made **positive remarks** about being able to **access nearby resources** through an **"intuitive" interface**, and the fact that they could be **guided with directions** towards their destination on a map.

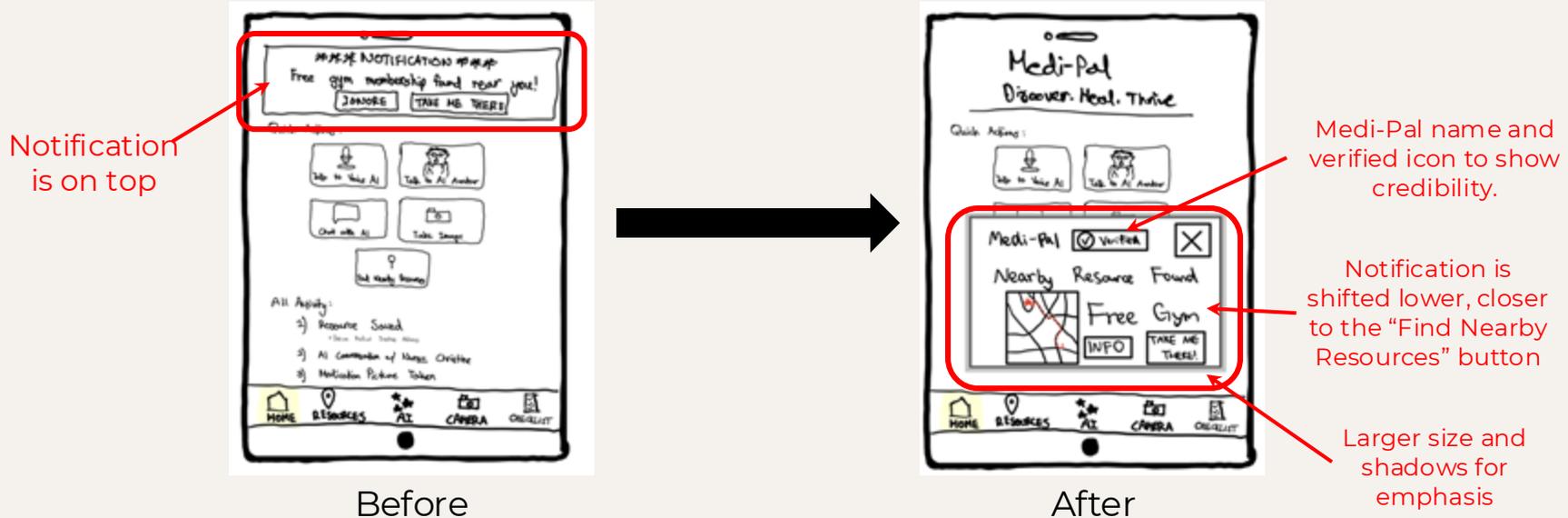


Our map feature was **relevant to the user's goal** of finding nearby resources, and it makes their life simpler as they do not have to open a new app and take an extra step to search for directions. So, this feature **should be kept** in future iterations.

Task #1: Possible Improvements

We have decided to focus on this issue with the highest severity:

- The pop-up notification for nearby resources looked like an advertisement, and was not obvious for some users.
- Solution: Redesign the pop-up notification.



Task #2: Bottom-Line Data

	Kevin	Polly	Quinn	Ryan	Avg.
No. of errors	2	7	2	5	4
No. of explanations needed	1	4	1	2	2
Task completion time	2:21	6:37	1:45	4:03	3:42

Key Takeaways: There was significant variability in users' efficiency and learnability. This suggests that some users really struggled to learn how to use our features and needed a significant number of explanations to complete the task.

Task #2: Critical Incidents Log

User	Incident	Positive/ Negative	Severity	Possible Mitigation
Polly	Could not complete the task due to a misunderstanding between the “Resources” & “Nearby Resource” buttons. Our “Computer” had to improvise a new task flow to accommodate her.	Negative	4 - Usability Catastrophe	We may want to merge these two buttons or rename them.
Ryan	After pressing the wrong button twice : “It’s the same page I just looked at. We’re back to the gym.”	Negative	3 - Major Usability Problem	Same as above.
Quinn	Chose to talk to AI instead of the intended “Resource” tab.	Negative	1 - Cosmetic Problem	Give users multiple options (e.g., talking to AI) to complete the same task
Kevin	Unexpected interaction behavior: Inside the “Resources” tab, Kevin’s first reaction was to look at existing resources instead of clicking “Add New Resource”.	Negative	0 - No problem	No mitigation needed. This is a harmless mistake that is part of learning a new platform.

Task #2: Additional Observations

Discouraged by Perceived Effort

One user explained that she avoided the “Resources” tab because she expected it to display a long list of resources, which makes her feel “braindead”. This suggests a mismatch between the user’s mental model and our app’s design. We will need to perform more testing to make sure that users do not associate any features with negative connotations.

Reluctance to Provide Additional Input

During this task, users were prompted by the system to take a photo of a document. One of our users was reluctant to take photos of the document, and was later reluctant to respond to a follow-up message. This suggests that users may question why they need to provide additional inputs, and instead want all information to be fed to them at once.

Strong preference for AI navigation

Again, the initial reactions of most users was to talk to AI instead of navigate the home menu. This time, it was more prevalent as 3 out of 4 users made this choice. Apart from the fact that chatting with AI consumes less cognitive effort, another explanation for such user behavior is the positioning of buttons. Chatting with AI (and “Find Nearby Resources”) were buttons positioned centrally in the home menu, while the “Resources” tab is at the bottom of the screen.



Ryan refusing to respond and provide additional input on multiple occasions.



Multiple users picking “chat with AI”/“talk to voice AI” instead of choosing the intended “Resources” tab.

Task #2: Discussion and Key Insights

Usability Goals

Reason

Key Takeaways

There were **significant learnability barriers** for this task.

Most users tried to search for resources with the “Find Nearby Resources” button, and did not realize they had to click the “Resources” tab. Factors that contributed to this learnability headache included **confusion between the two buttons** and mismatches between users' mental models and our app design.

The label “Find Nearby Resources” is misleading because it uses the word “find”, which users would **associate with the action of searching**. We will need to label our buttons more clearly to help users learn about our features without relying on trial and error. We should also explore the design of other apps used by our target users, so we can design layouts that look more familiar to users.

Efficiency bottleneck:
Some users were stuck in a loop

Most users **repeatedly performed actions that we did not intend**, such as clicking “Find Nearby Resources” and “Chat with AI” (which was later incorporated as a valid task flow). This **prevented them from advancing** in the task.

For most users, their **attention is drawn to the home screen** (with buttons such as “Find Nearby Resources” and “Chat with AI”), instead of the bottom tabs. With this in mind, placing key buttons away from the user's center of attention can reduce efficiency because they become **less noticeable** for users.

Significant **potential for improvement** regarding **efficiency**.

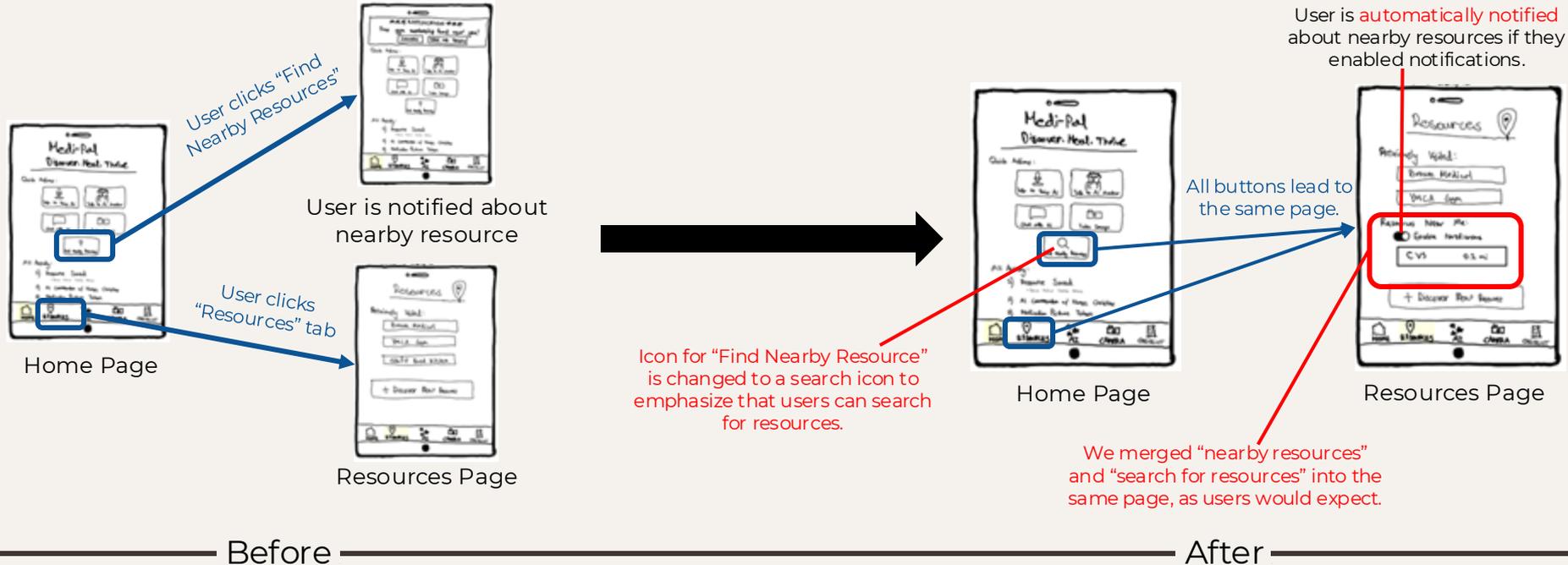
Our users' (i.e., Quinn's) **task efficiency improved significantly** after we allowed users to direct access the “Resources” page through the “Chat with AI” button. This suggests that **AI can potentially serve as a signposting tool** that guides users to their desired actions more quickly.

Chatting with AI allows users to perform their desired actions more efficiently because they can **specify their needs directly in natural language** rather than search through a menu and think about which button is the most suitable. However, it remains to be seen whether AI can reliably serve as an effective signposting tool.

Task #2: Possible Improvements

We have decided to focus on this issue with the highest severity:

- Users failed to distinguish between the “Find Nearby Resource” and “Resources” buttons.
- Solution: Let both buttons point to the same page + Additional Modifications shown below



Task #3: Bottom-Line Data

	Kevin	Polly	Quinn	Ryan	Avg.
No. of errors	0	1	0	1	0.5
No. of explanations needed	0	0	0	0	0
Task completion time	1:18	2:11	2:26	1:10	1:46

Key Takeaways: User performed well in terms of learnability and efficiency, as they completed the task quickly and did not need any explanations.

Task #3: Critical Incidents Log

User	Incident	Positive/ Negative	Severity	Possible Mitigation
Quinn	Did not want to respond to AI chats with follow-up questions as we intended.	Negative	2 - Minor Usability Problem	Some users may prefer having information given to them in one go.
Ryan	Misclick: Clicked "Checklist" instead of "Talk to AI" for health planning.	Negative	1 - Cosmetic Problem	We should let users talk to the AI agent/avatar at the "Checklist" page too (i.e., provide flexible options to perform the same task)
Polly	Really liked the avatars and found them cute, but she wasn't able to discover them on her own. She learned about it from other exposed sheets of paper on the side.	Negative	1 - Cosmetic Problem	We may show the avatars on the home page.
Kevin	Said "this makes sense to me" while looking at our checklist.	Positive	0 - No problem	N/A. Keep the checklist.

Task #3: Additional Observations

Unanimous Preference for Text over

Voice users preferred to communicate using text instead of voice → contradicts our initial assumption that low-income users prefer voice interaction.

- Possible explanation: Users may want to have **more control** over their inputs and **confirm** that their request is correct. Also, voice is illogical on paper prototypes.
- **Sampling bias**: All participants were recruited from a library setting and may be more digitally literate than the typical low-income person in our target user population.

Perceptions about avatars

- Some users perceived avatars as trusted community ambassadors because of their doctor and nurse roles.
 - Aligns with our goal of building rapport through avatars.
 - However, we are unsure whether users are aware that these avatars are AI instead of real people.
- One user preferred text chat with AI for quick questions and the avatar for detailed queries.
 - Takeaway: users perceive text chat as **more convenient for simple tasks**, but may view avatars as helpful for complex tasks due to **rapport** and the opportunity to **communicate through multiple modalities** (e.g., tone of voice, gestures).



Multiple users indicating a preference for text over voice.



Polly explaining how she would talk to AI/avatars depending on situation.

Task #3: Discussion and Key Insights

Usability Goals

Reason

Key Takeaways

Users were able to **quickly learn** how to perform this task.



Despite this being a complex task, users seemed to find it most intuitive and made the fewest errors. This suggests that users found talking to an AI interface **natural** and **requires minimal learning**.



In our future tests, we may need to use Wizard-of-Oz prototyping to simulate AI responses to verify whether users truly find it easy to interact with an AI system.

High task efficiency



However, since user input was pre-determined in our low-fi prototype, we could not evaluate whether users can learn how to ask queries that gave the desired responses.

Similarly, users were able to complete the task quickly because they were **not slowed down by any errors**. Users were more efficient at completing this task as they did not have to search for particular buttons. It also helps that most users are self-reported fast typers and can chat quickly with AI.



In previous tasks, we predicted that users would perform more efficiently for tasks where AI are involved. This prediction is confirmed by this task, as the **task completion time is significantly lower** than the previous tasks, despite its higher complexity.

Users **may not perceive voice interaction** as useful.



As previously mentioned, all of our testers preferred to type. Based on this sample, one can extrapolate that users **may view voice chat as irrelevant** to their needs.

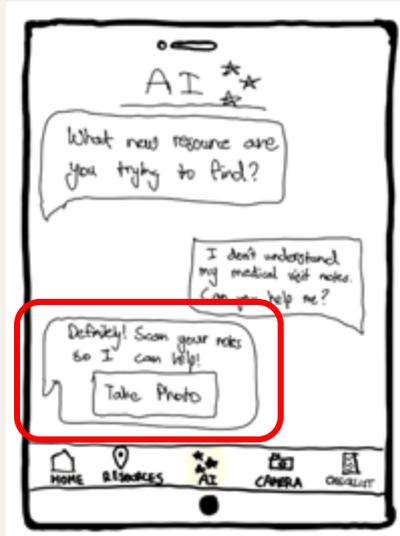


We may have to reconsider whether we should emphasize on having a voice interface, as it does not provide as much value to users as we expected. More user testing will need to be done to determine whether our results reflect the reality or just sampling bias.

Task #3: Possible Improvements

We have decided to focus on this issue with the highest severity:

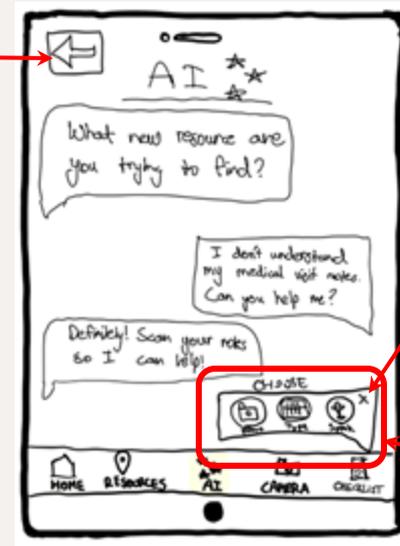
- Some users do not wish to respond to follow-up information from AI.
- Solution: Additional button for users to opt-out from providing additional information.



Before



Users can exit the conversation at any time.



After

Overall: Bottom-Line Data (Usefulness)

	Perceived Usefulness Rating (out of 10)
Kevin	10/10
Polly	8/10
Quinn	9/10
Ryan	9.5/10
Avg.	9.1/10



Kevin believes that Medi-Pal will make a significant social impact.

Key Takeaways: Our users generally viewed Medi-Pal as a useful addition to their lives. These were not just polite comments, as they were able to justify their score and explain how Medi-Pal would help a lot of people from their demographic.

Overall Feedback: Additional Critical Incidents

User	Incident	Positive/ Negative	Severity	Possible Mitigation
Polly	Mentioned that she hoped that the app can support more options. For context, she did not go through the expected task flows and often used another valid task flow.	Negative	2 - Minor usability Problem	Give users multiple options to complete the same task
Quinn	When asked about how she felt about our app in the end, she said "it's a good exercise"	Mostly Negative	2 - Minor usability problem	Slight learnability concerns. We will need to make our general layout more simple.
Kevin	"The app was simple and intuitive. It guides me step by step."	Positive	0 - No problem	N/A. Keep up the good work.
Ryan	Asked us about how to find free Medi-Cal gym after we finished.	Positive	0 - No problem	N/A. Confirms we are on the right track.

Conclusions about usefulness: Users viewed our app as highly useful because they viewed it as a tool they can use in their daily lives. However, perceptions of usefulness are also **influenced by other usability factors** such as ease of use, as some users (i.e., Polly) viewed the app as less useful due to frustrations with learnability and task efficiency.

07

Discussion

Implications of our Findings

Support multiple task flows for each task

- We overlooked the importance of **providing flexible options** for users. We assumed that a simple, one-size-fits-all layout would be sufficient, as most apps are designed like that. But, we observed from our tests that each user had different mental models and different preferences for how to complete each task.
 - For example, Polly and Ryan preferred to complete tasks by talking to AI, while Kevin is comfortable with reading menus.
- Polly's comments at the end reveals how lack of support for alternative task flows can lead to a **frustrating user experience**.

Re-evaluate the importance of voice interfaces

- Our target users were **more comfortable with interacting through text** and less comfortable with interacting through voice than we expected.
 - This presents a challenge for us as we would need to incorporate multimodality in a way that truly provides value to our user group.
- At the same time, it remains to be seen whether talking avatars can truly build rapport with our target users. There is some promise (i.e., Polly found the avatars cute and Quinn viewed the doctor avatar as trustworthy), but we will need to verify this through further testing.

Users do not read everything on the screen

- From these tests, we learned that **users tend to only scan the app and focus on their first reads**, such as large items in the center. This happens even if the app had minimal text.
- We were under the impression that navigation tabs on the bottom of the screen would be seen by users. However, apart from the tech-savvy Kevin, **none of the users seemed to notice the bottom tabs**.
 - A possible explanation is that our target users typically have lower digital literacy and are therefore unfamiliar with typical app layouts.
 - We will need to keep this in mind and make sure to put important things in the center of our users' attention, and question every common app design choice before incorporating it into our design.

Limitations of Usability Testing

Fails to Predict Long-Term Impact

Low-fi usability tests only capture specific interactions within a single session, and do not explore how user behavior may change over time as they become more familiar with the app. This means that we would not be able to test how often users used Medi-Pal, whether users view Medi-Pal as useful after regular use, and how users may adopt new features.

Inability to test advanced features in real-world settings

We were unable to test how users would interact with features such as talking to AI agents and location services, as low-fi prototypes generally have pre-defined layouts and text that only support fictional scenarios. As a result of this, our participant's learnability and efficiency scores for AI-related tasks may be higher than they are supposed to be.

Excluded Populations

We approached two unhoused individuals to test the prototype, but they appeared overwhelmed by the large stack of paper and were suspicious that we were trying to trick them. As these populations were not involved in the study, their perspectives were excluded.

Made-up Scenarios

The low-fi prototype is designed to be identical for all participants. As some of our tasks were scenario-specific, participants had to role-play as a predefined persona while testing our prototype, rather than interact with the app based on their own use cases and preferences. This prevents us from viewing how users may naturally interact with our app.

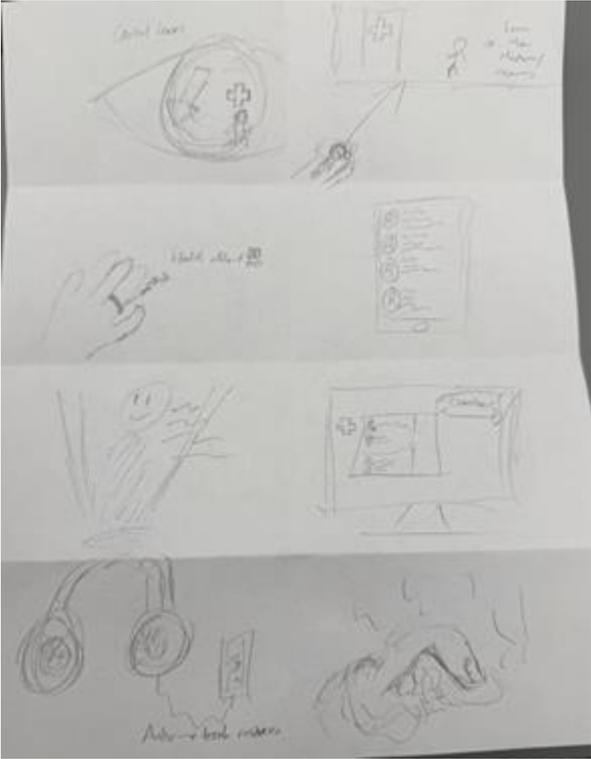
08

Appendix

40+ Solution Ideas Across Modalities (Douglas)



40+ Solution Ideas Across Modalities (Nash)



Full Pros & Cons - Modality #1: Voice + Avatar AI

Pros

- **Proactive outreach:** Easily supports voice reminders, check-ins, and outbound calls – useful for nudging
- **Low action friction:** “Call now /schedule” flows are one voice command away; reduces the cognitive load of directories.
- **Trust & Engagement:** AI avatar + voice mimics a human helper (higher perceived empathy), which increases uptake and follow-through
- **Multimodal redundancy:** Speech + captions + avatar lip-syncing gives multiple pathways for comprehension (audio + visual + text).
- **Accessibility:** removes literacy and complex UI barriers → people can speak naturally in any language and hear personalized answers
- **Least Invasive and Cheapest for User:** user can disable/enable Medi-Pal at their convenience + no cost to user
- **Hyper-personalization of Information:** Voice dialogue allows for significantly more personalization since speech is more natural than typing

Cons

- **Language/dialect coverage:** ASR and TTS quality varies; accents/low-resource languages degrade performance.
- **Hallucination Risk:** LLMs can hallucinate occasionally or give incorrect advice on eligibility or benefits → risk of losing trust
- **Privacy & compliance:** Handling PHI/benefit info may trigger HIPAA-level concerns or state privacy rules.
- **Cost:** LLM prices, especially with real-time avatar rendering, is quite expensive
- **Trust mismatch:** Synthetic voices/avatars could feel creepy or patronizing if not well designed or culturally tuned.
- **Technical Performance:** Voice & Avatar AI requires high-speed network coverage + cloud processing
- **Edge cases require humans:** Complex eligibility questions will still need escalation to real caseworkers.

Full Pros & Cons - Modality #2: Extended Reality

Pros

- **Proactive outreach:** Easily supports voice reminders.
- **Immersive experience:** Users may find the experience of browsing resources in a 3D environment more enjoyable than scrolling through a list, as it feels more like an adventure than a chore. This would make users feel more engaged while using Medi-Pal.
- **Guided navigation:** Users would not have to read a map to view nearby resources or navigate to their desired resource. Instead, step-by-step navigation directions are shown directly within their view. This is extremely helpful for low-income and no-income users who may struggle with map literacy.
- **Hands-free interaction:** Users do not need to perform physical actions such as pulling out their phone to scan an object/search for items. This is particularly helpful for unhoused users who may be carrying a lot of items.
- **Opportunity for emotional connection:** In our realization, we present virtual avatars that interact with users in 3D space. As these avatars appear in real-world environments through augmented reality, users may feel that these avatars are like genuine companions, and subsequently build trust and rapport with Medi-Pal.
- **Highly personalized experience:** Users can customize a personal environment that only they can see.
- **Visual Overlays:** Overlays can help users decipher their environment and makes decision-making more effortless.

Cons

- **Lack of familiarity:** Low-income and no-income populations generally lack experience with using extended reality headsets. There would be significant learning costs if users wish to use Medi-Pal through VR and AR headsets, as they would need to first learn how to use the headset.
- **Low digital literacy:** Low- and no-income populations typically have lower digital literacy, and may feel reluctant to adopt technologies that they view as “fancy”.
- **Physical discomfort:** Wearing extended reality headsets for a long period may cause eye strain and discomfort. This may worsen some of their health conditions.
- **High costs:** AR/VR systems are financially inaccessible for our target users. One of our interview participants from Needfinding mentioned that he did not even have money to afford a regular T-Mobile phone plan. This suggests that our target users would not be able to afford AR/VR systems, which require monthly costs for purchasing headsets and high-speed internet connection.
- **Privacy concerns:** Extended reality headsets collect biometric data → users may feel uncomfortable.
- **Social discomfort:** Users may feel uncomfortable with wearing a headset in public.
- **Lack of private spaces:** Low- and no-income populations may not have a large, quiet space to use an extended reality headset.

Link to all screens on our low-fi prototype

https://drive.google.com/file/d/1qrzIvIAS0byEVEWqFyNHYYKkhRnf_FPsr/view?usp=sharing

- Includes all screens and widgets that we've cut out.