

DigiFam

Alleviating Loneliness Among Elderly Family Members

Team

Mimi Ruo - research, storyboarding, design, task development

Lisa Vo - research, storyboarding, design, ideation

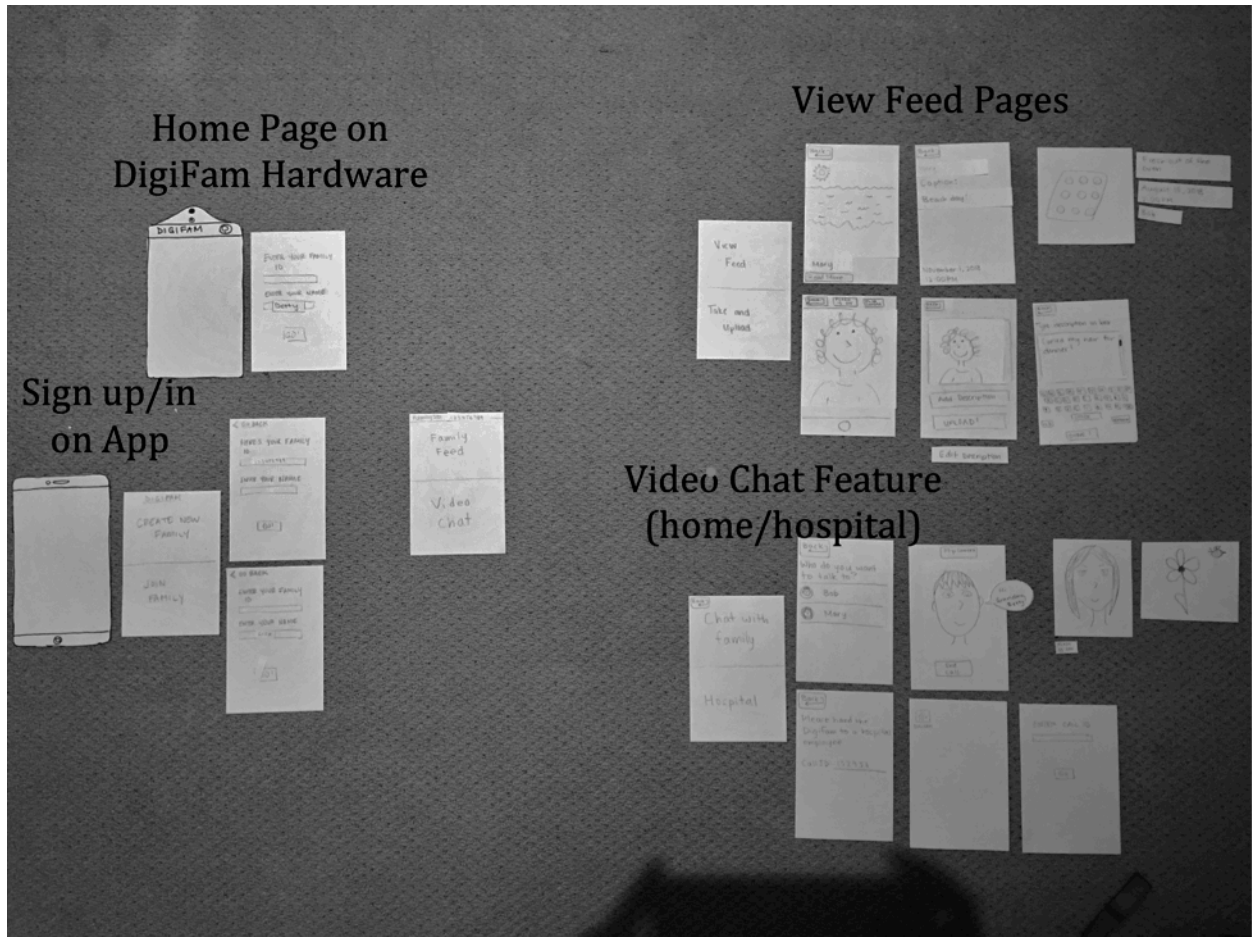
Rachel Zigman - research, design, writing, digital mockup

Problem and Solution Overview

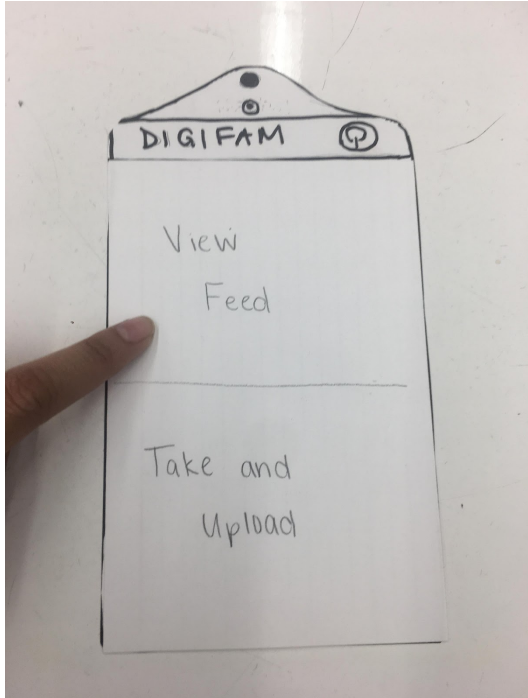
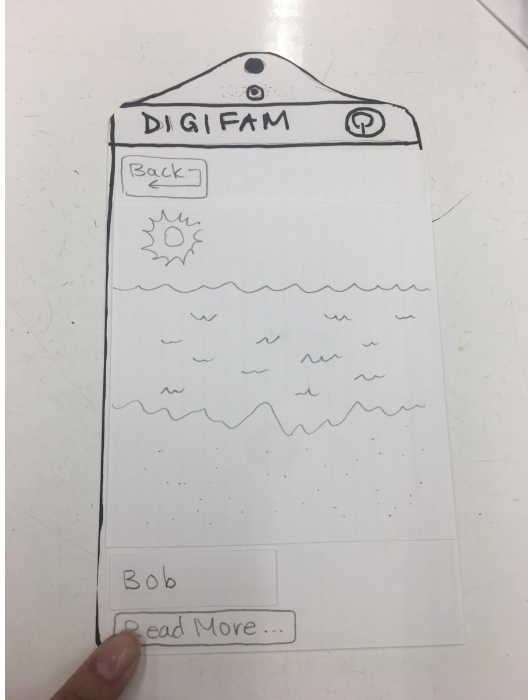
In a tech-oriented society engrossed in individualism, as opposed to collectivism, certain demographics can easily be left out of the hustle and bustle of everyday life. One demographic that is easily susceptible to being left out is the elderly. Some problems that the elderly face that we want to address are their experiences with loneliness, isolation, and the lack of communication between them and their families. We are proposing a new piece of hardware called the DigiFam paired with an app that would be simple enough for elderly people to learn and use on a basis. The DigiFam is a wearable device with a touchscreen that can be worn around an elderly person's neck. It has two main functions: 1) providing a feed of pictures posted by family members so the elderly person can receive daily updates of their family and 2) a video call function that can be used during hospital visits in conjunction with hospital iPads to video chat with family members. The DigiFam will help ease feelings of loneliness and isolation in addition to creating accessibility between the elderly and their families.

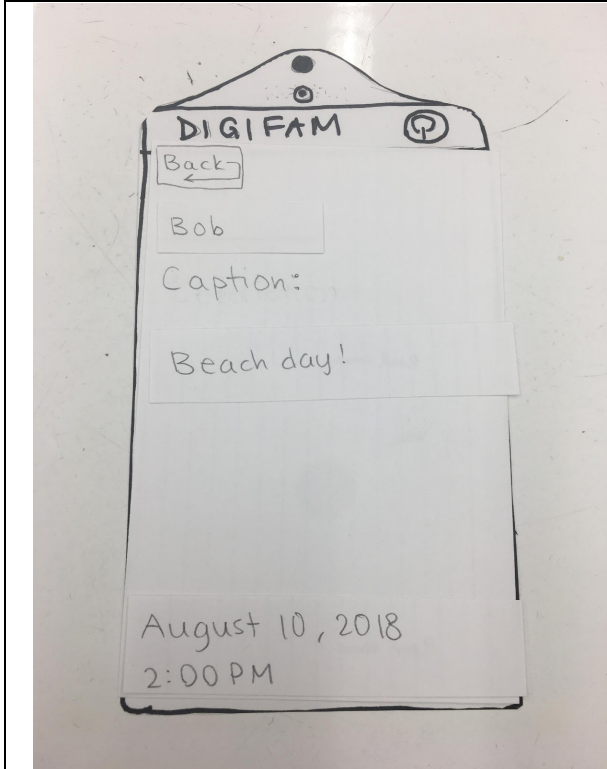
Initial Paper Prototype

Overview:

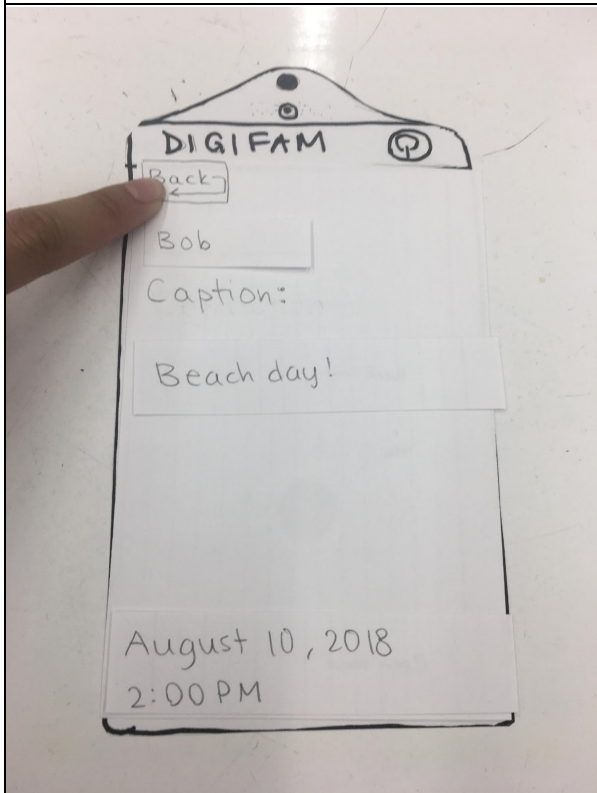


Task 1: Viewing photo updates

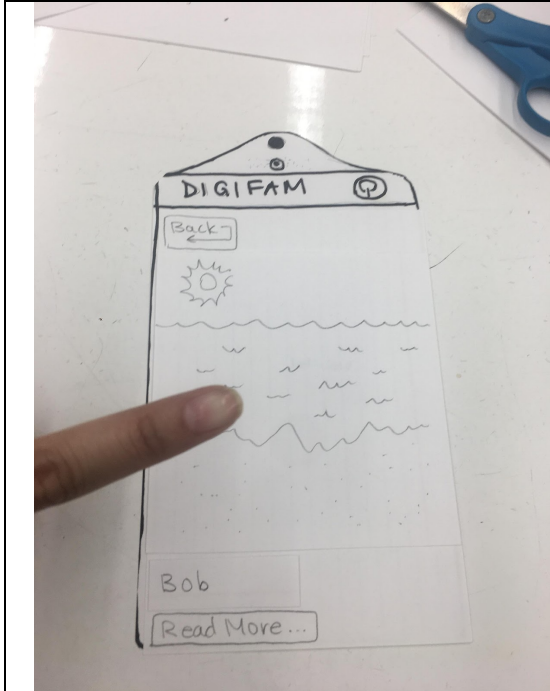
Picture	Description
	Choosing "View Feed"
	Choosing "Read More"



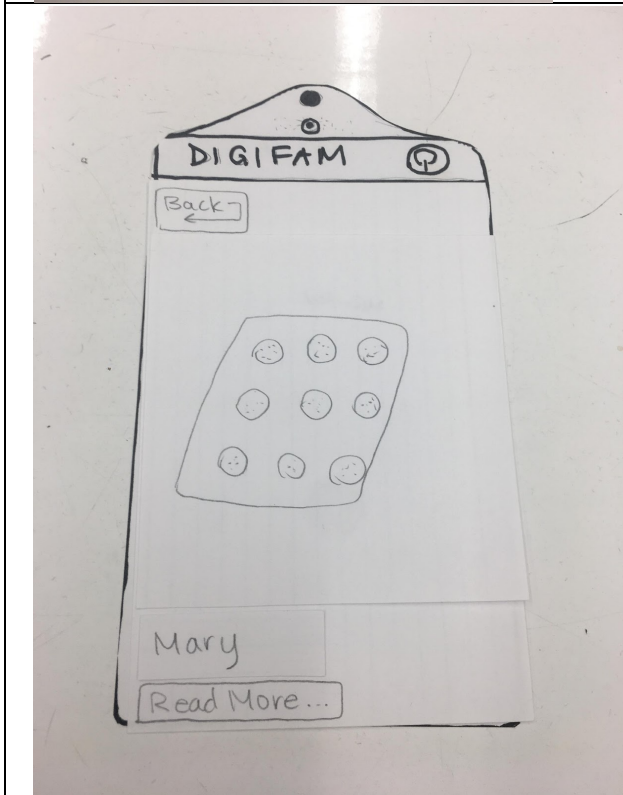
Looking at the caption for the photo



Pressing "Back" to return to the photo feed

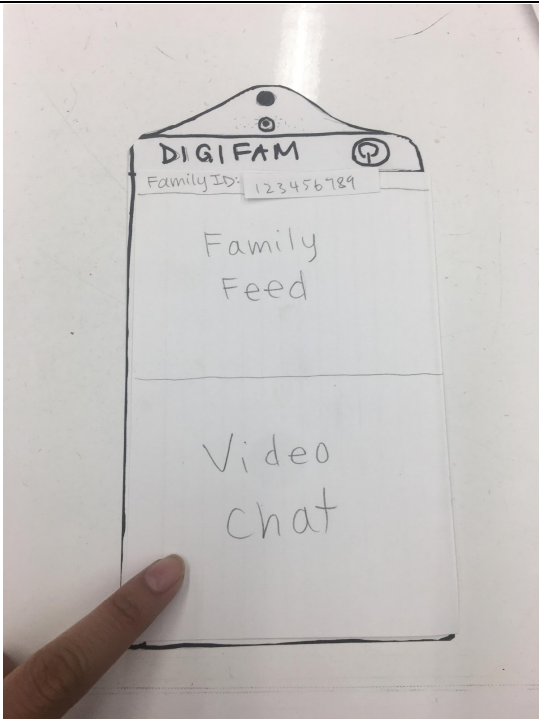
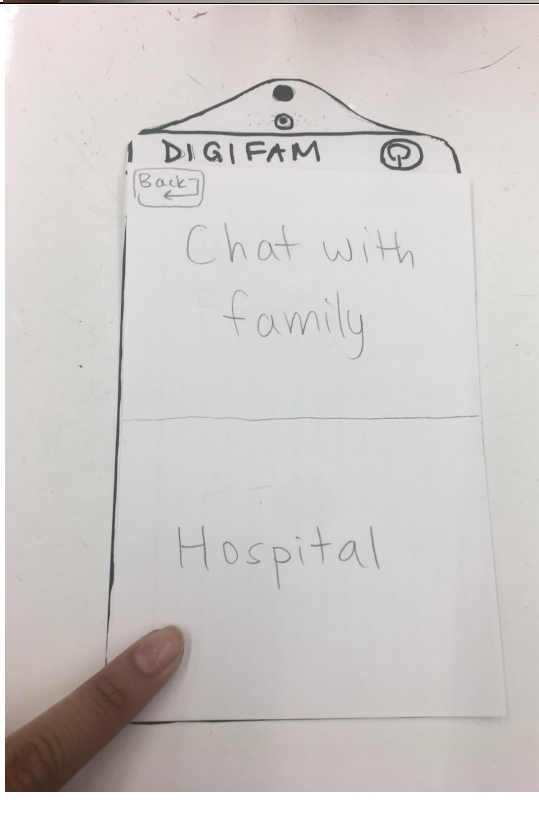


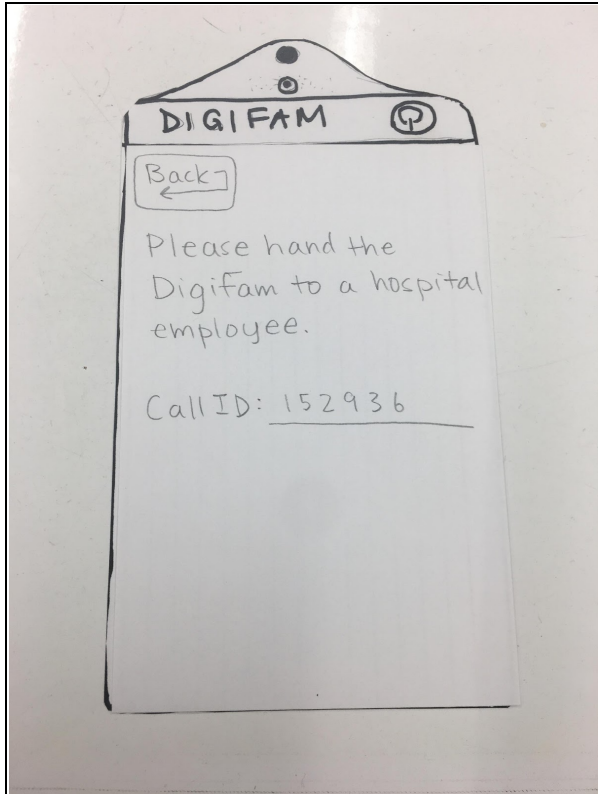
Scrolling down to see the next photo in the feed



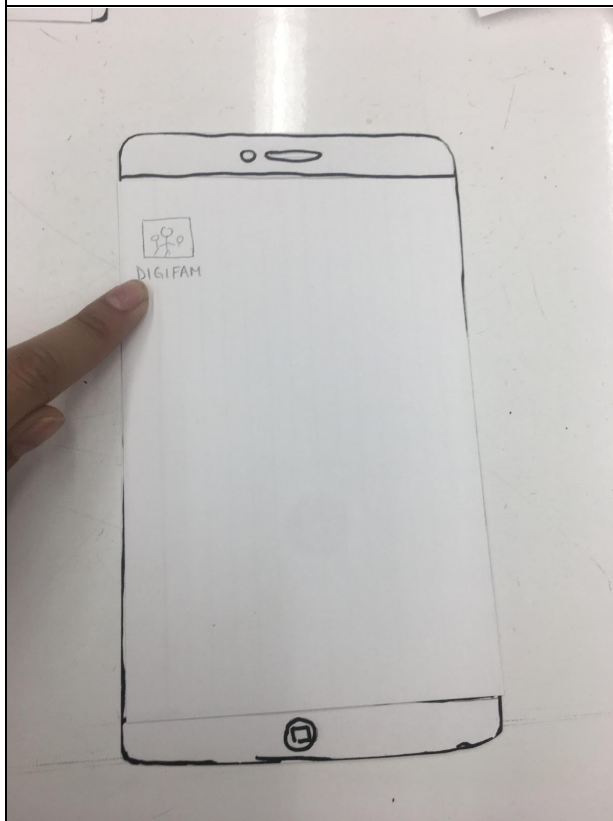
Viewing the second photo in the feed.

Task 2: Connecting to a hospital iPad during a hospital visit

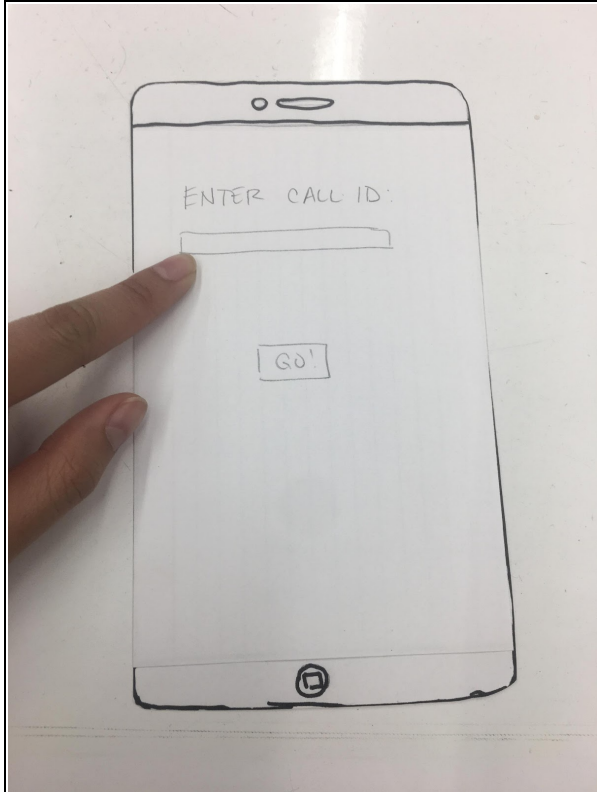
Picture	Description
	Choosing "Video Chat"
	Choosing "Hospital"



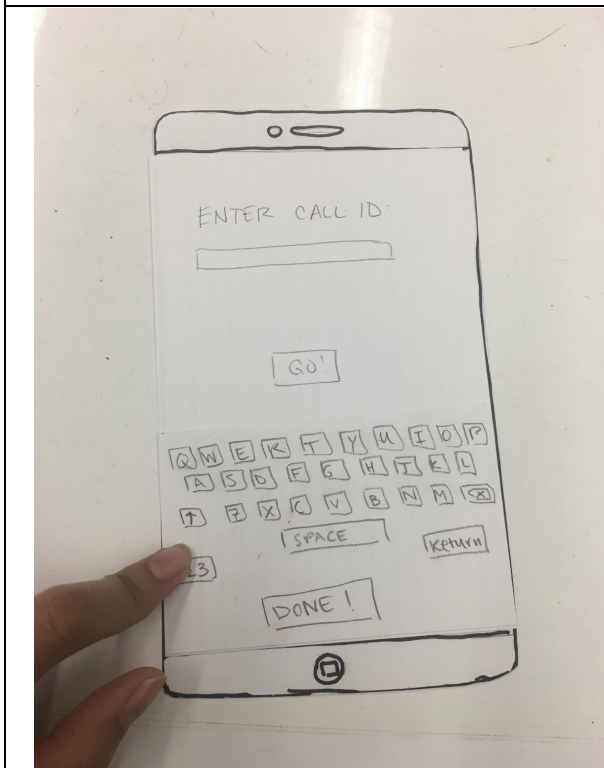
The DigiFam displays a CallID and prompts the user to hand the DigiFam to a hospital employee.



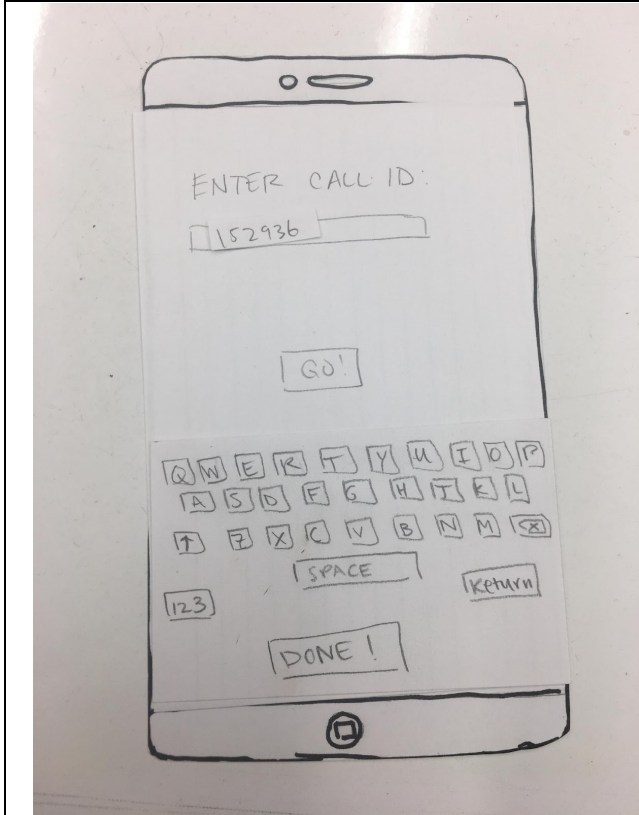
On a hospital iPad, the hospital employee chooses the DigiFam app from the main menu.



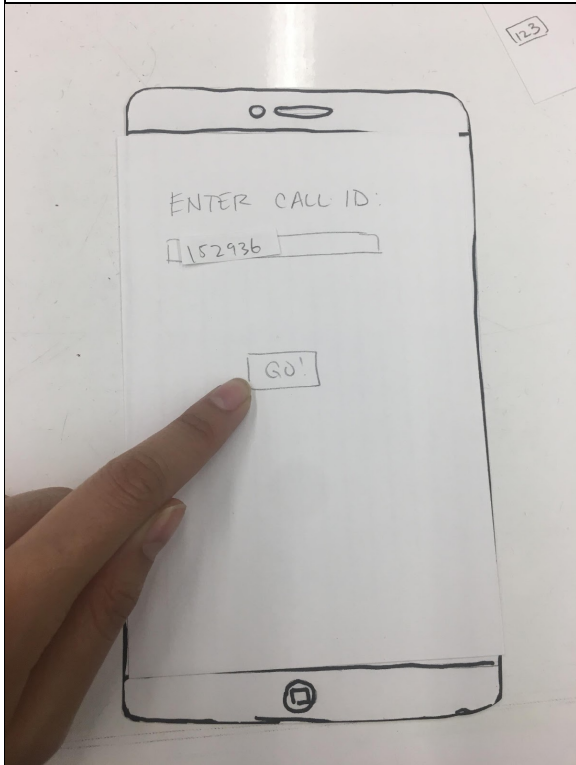
On the hospital iPad, the employee taps the blank box.



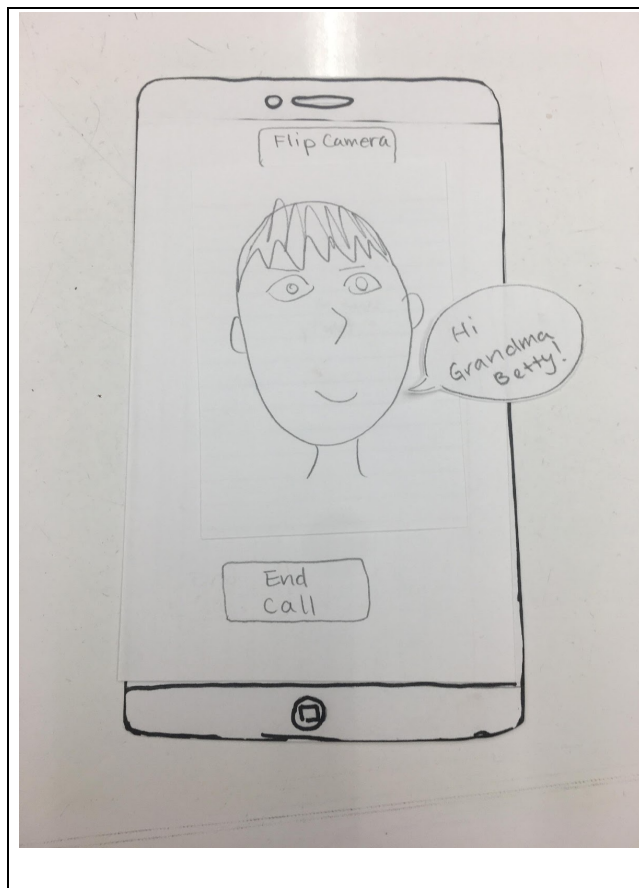
A keyboard pops up. The hospital employee enters the same CallID that was on the DigiFam and hits "DONE!"



The CallID has been entered.



The hospital employee hits "Go!"



The family member of the user appears on the hospital iPad and now the user can talk with them during the hospital visit.

Testing Process

Process:

For each test, we explained our goal and domain and then asked the participant to try and complete our two main tasks: 1) viewing photo updates from family and 2) having accompaniment during hospital visits. At first we answered any confusions about how to proceed with the tasks the participant had during the test and only asked general questions at the end, such as "Do you have any thoughts about our design?" We realized that answering every doubt the participant had during the test wouldn't be as natural or accurate as having the participant attempt to finish the tasks without any help, so after the first usability test we asked participants to finish the task without any input from us. At the end, we asked participants to tell us about any confusions they had during the test and we also asked them how they felt about specific design choices, such as button labels. Lisa took notes, Mimi facilitated the prototype, and Rachel acted as a liaison between these two roles.

Participants:

Our first participant is a male undergraduate senior majoring in public health and studying to become a doctor. He was previously a volunteer at an assisted living facility and his current job shadowing role involves seeing older patients constantly. Additionally, he hopes to get a master's degree in public health, focusing on diversifying medical practices that usually exclude underrepresented groups in research. He is also a potential future stakeholder who could use our design as a family member. From his suggestions, we made a few changes to the UI to make things clearer, among them changing the language to something more elderly-friendly and labeling the button for taking a photo.

Our second participant is a 65-year-old woman living in Redmond. Although she does not live alone and says she is not lonely, she does not have much experience using smartphones without the help of her family so we thought she would be a fitting candidate to test if an elderly person who is relatively unfamiliar with technology could successfully use the DigiFam. The two revisions her suggestions led us to were a way to change the volume and a way to tell the battery level of the DigiFam.



Our third participant is a mother of four living in Sammamish, WA. All of her kids have grown up and no longer live at home or even in the state. She lives alone and misses her family, but does not want to bother them with phone calls. She is also not very skilled when it comes to technology. While this participant is not as old as some of the participants in our original research, we thought she could provide good feedback about our design given her living and family situation and her lack of technological knowledge. For the testing protocol, we started her at the login screen on our DigiFam device and had her walk through the different choices. We did so without telling her what she should try or what anything means, and then took notes on her comments and questions. From her comments, we realized that we needed to make it so that the person using the app could see their own face or whatever their camera is showing during video chat.

Testing Results

Heuristic Evaluation:

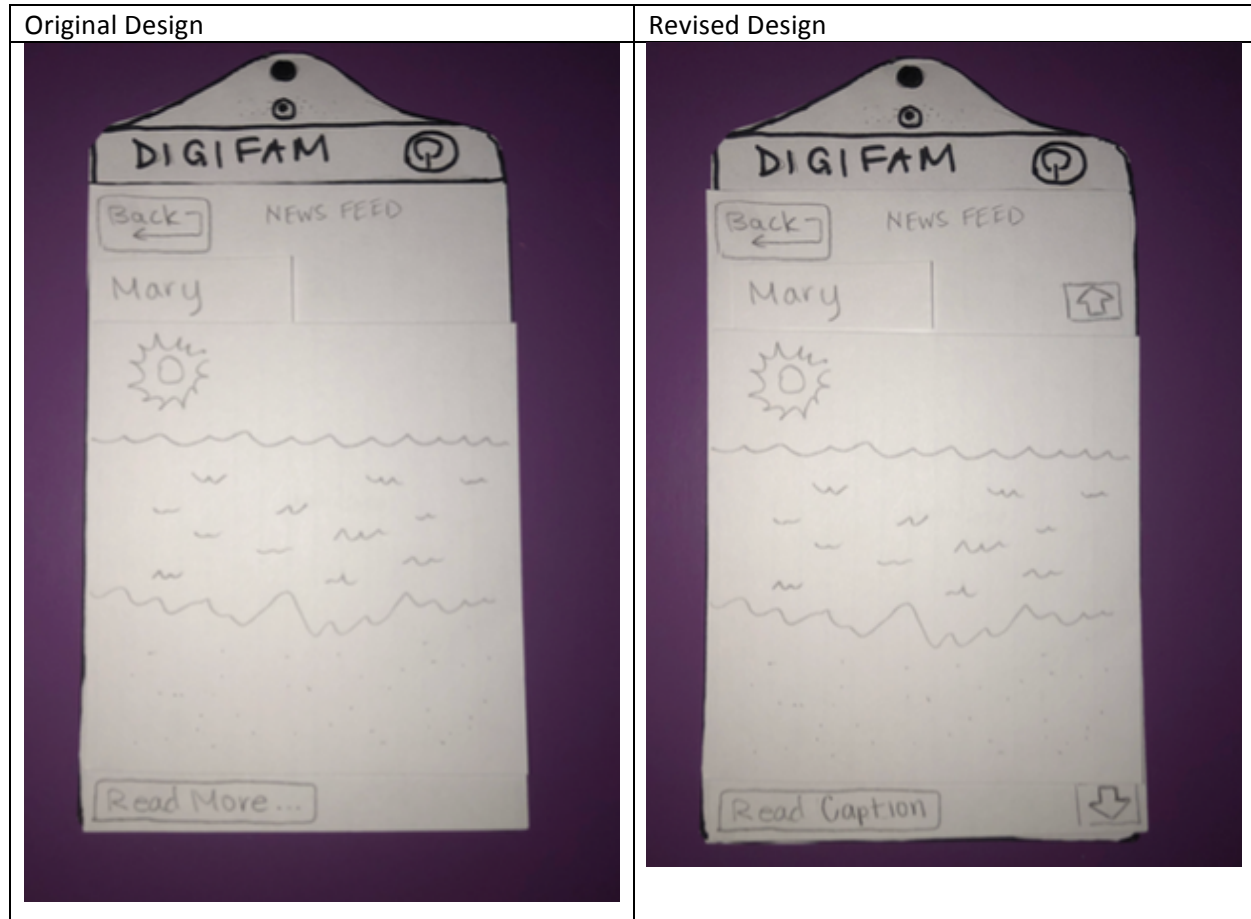
Issue #1: Scrolling on Family News Feed Page [Severity 2]

On the news feed page, there was no indicator on how to view the next (or previous) photo. Our initial idea was that the user would swipe up, however, given our target group this now common motion might not be known. In our new design, we added buttons to go up a picture or down to the next picture. These buttons are clear enough that we don't need to have words explaining them.

Original Design	Revised Design
	

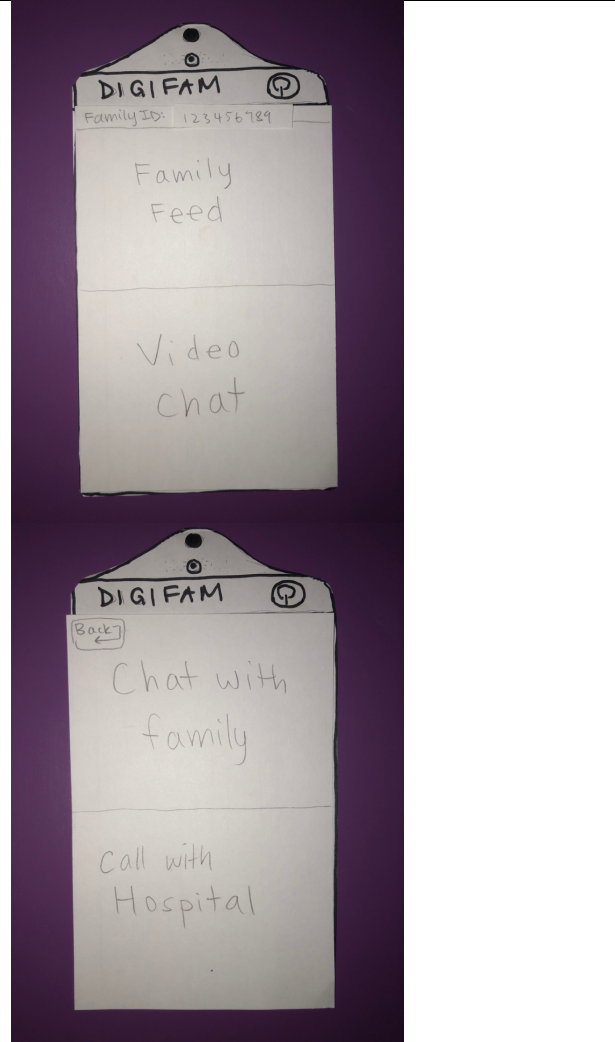
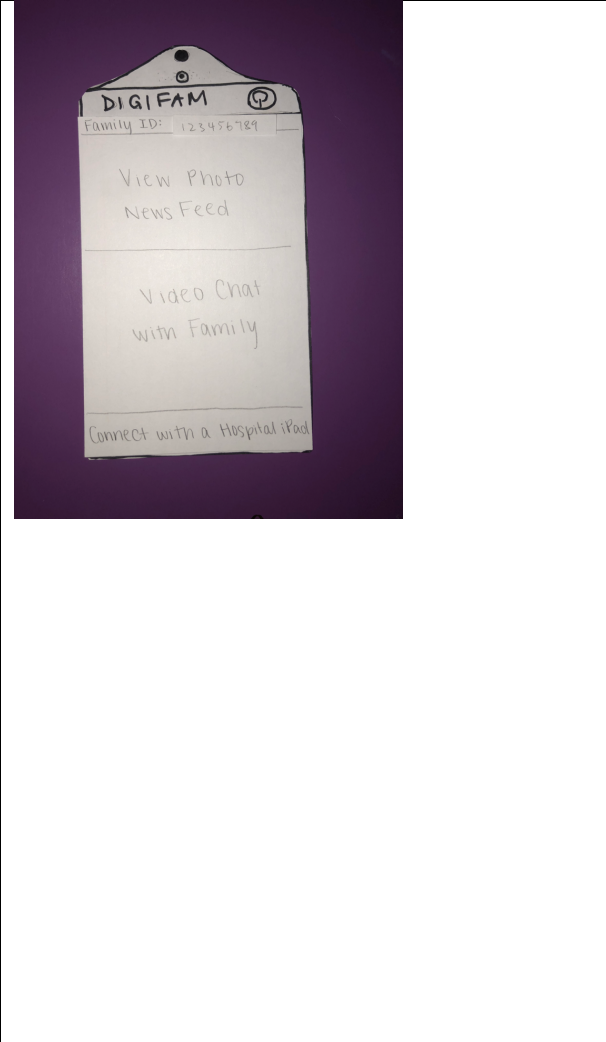
Issue #2: Unclear Button Names [Severity 1]

Problem: On the news page, the button to view the caption for the photo says “Read more ...”. It is not clear exactly what this button does - it could mean see the next photo or read a caption. We do not want to have any ambiguity with the names of our buttons because we want this to be as simple to use as possible. In our new design, we renamed the button to “Read Caption”.



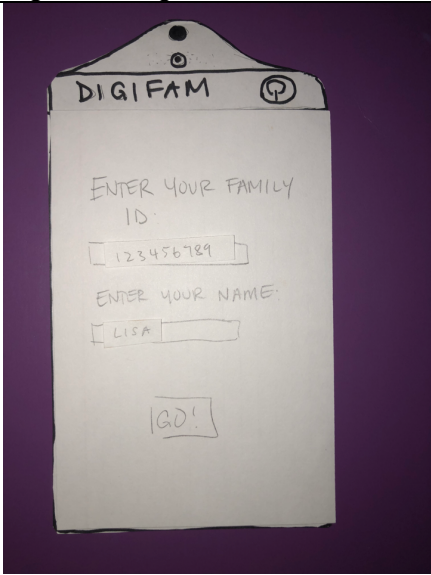
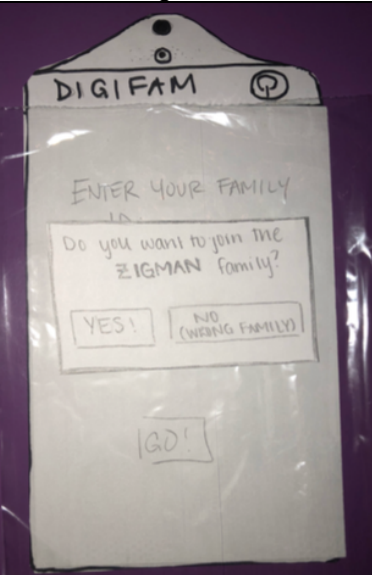
Issue #3: Unclear Button and on Misleading Screen [Severity 4]

The main screen of our device has two options: *View Feed* and *Video Chat*. When you click on *Video Chat* it directs you to another screen with the following options: *Call with Family* and *Call with Hospital*. These two buttons are not related enough to be on the same page and both under *Video Chat*. The *Call with Hospital* button is already hard enough to understand if you do not already know what it does, so also having it on a page with an unrelated other choice is extremely confusing and misleading. Also other main screen button names are slightly unclear to new users. In our new design, we are going to move the *Call with Hospital* button to the main home screen. We are also going to rename the button to *Connect with a Hospital iPad*, this name is much more clear on what the button's action is. We are also slightly renaming the other buttons on the main screen to be more clear for users.

Original Design	Revised Design
	

Issue #4: Entering Wrong Family ID [Severity 4]

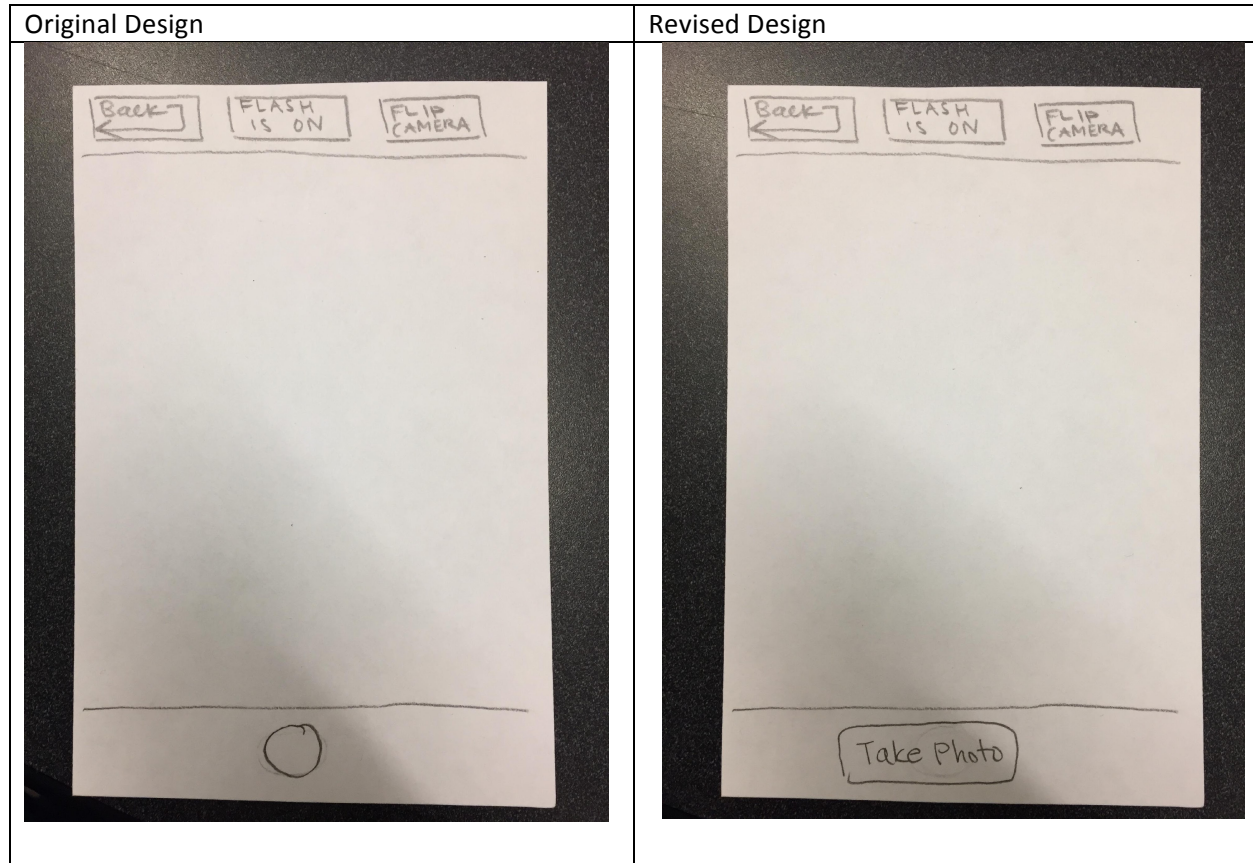
In our current design, there is no logout feature so if you initially enter the wrong family ID and enter the wrong family's system there is nothing you can. This is extremely confusing and can easily be avoided. Because we do not want to add a logout feature (this would make the app more complicated and then the user would need to remember the family ID all the time) we will solve this by adding a pop up. After you type in your family ID and press GO, a pop up window will show up asking "do you want to join the ____ (family ID will be used to find the family name that was registered with it) family?", to which you can select YES or NO (WRONG FAMILY). If you press NO (WRONG FAMILY) you will be able to retype the family ID and then be prompted again after pressing GO.

Original Design	Revised Design
	

Usability Testing:

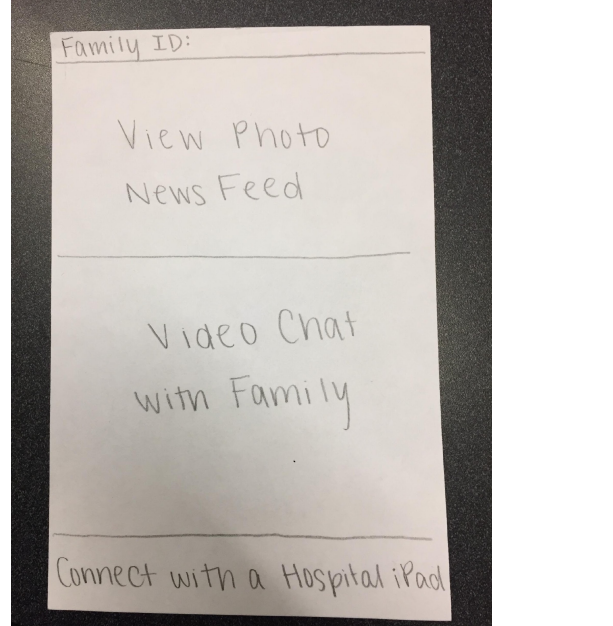
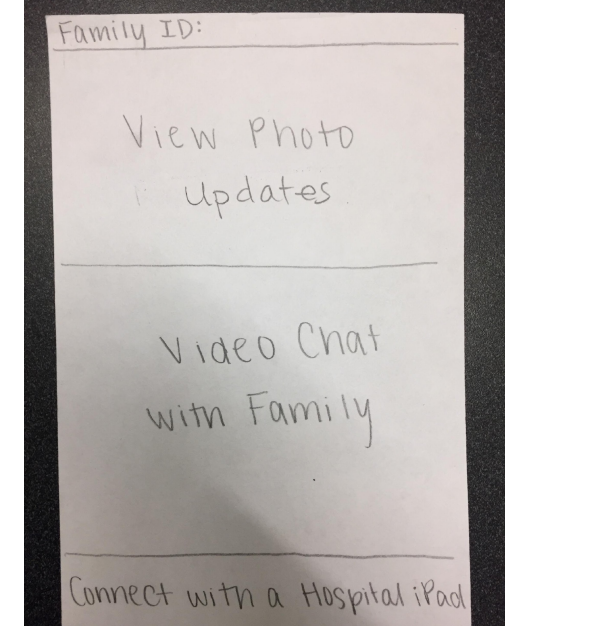
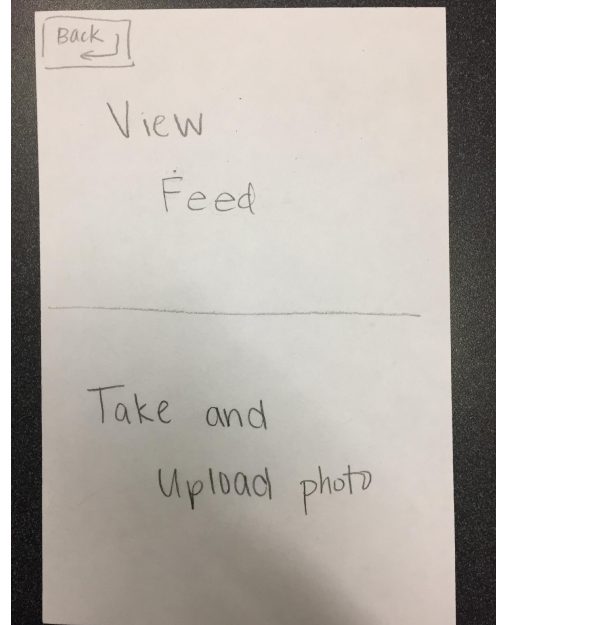
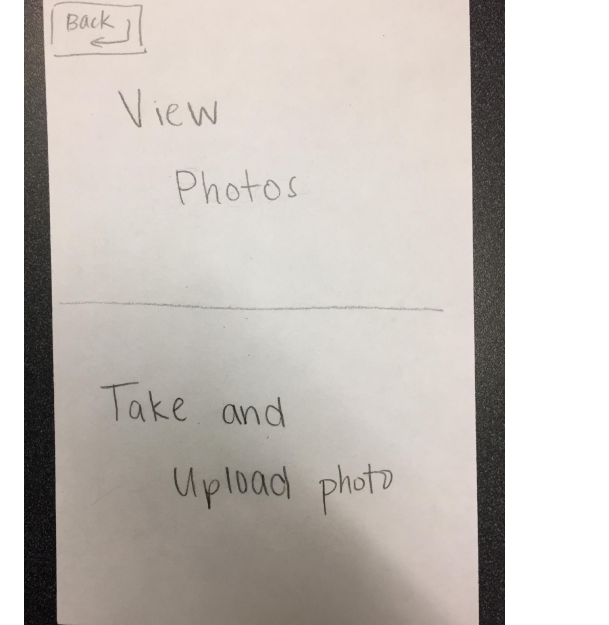
Issue #1: Camera “take photo” button is too blank [Severity: 1]

The lack of a label for the “take photo” button may confuse some users when they want to take a photo, especially those who are unfamiliar with technology. We added a label to the button so that it would be clear to all users what the button does.



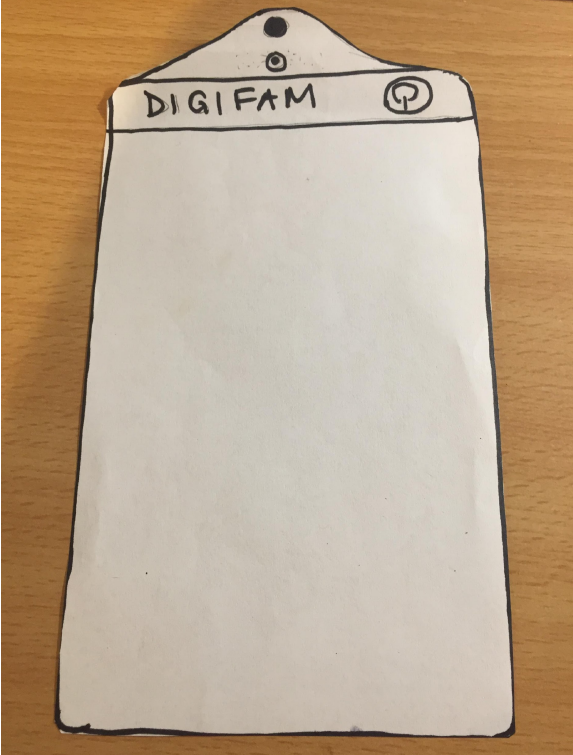
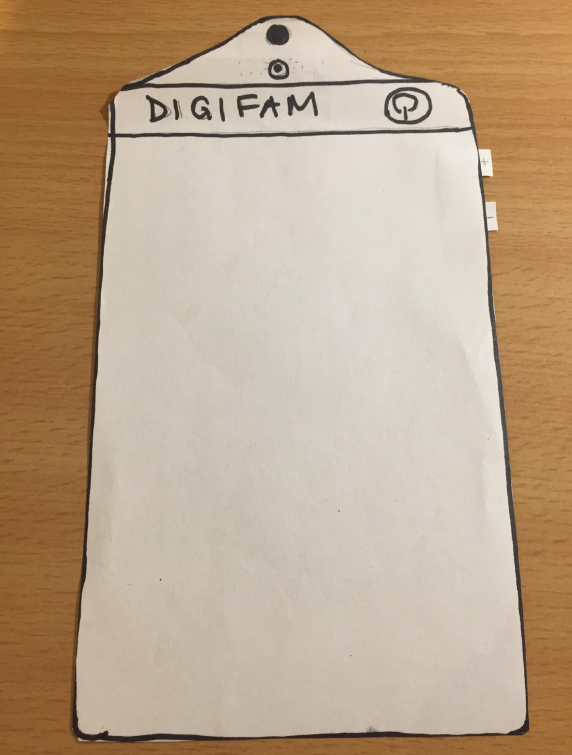
Issue #2: Participants may not understand what “feed” means in options [Severity: 1]

One of our participants suggested that the elderly may not know the term “feed,” so we changed our wording. “View Photo News Feed” was changed to “View Photo Updates” and “View Feed” was changed to “Video Photos.”

Original Design	Revised Design
	
	

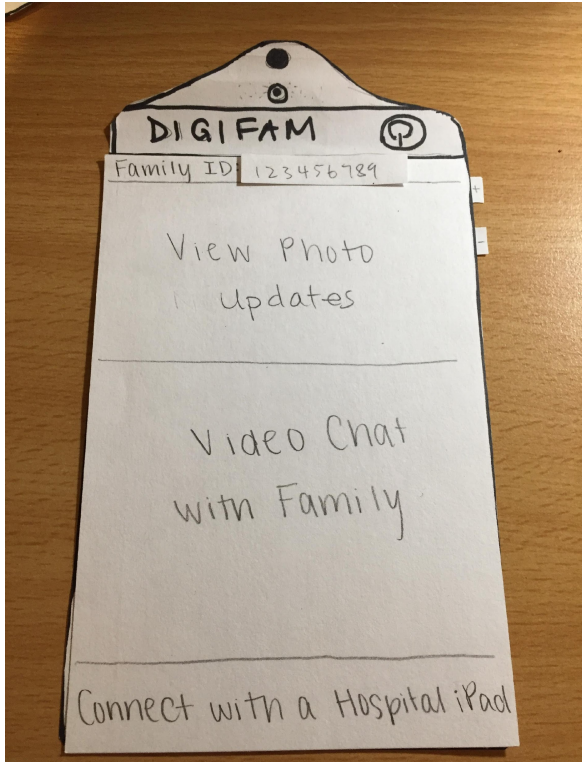
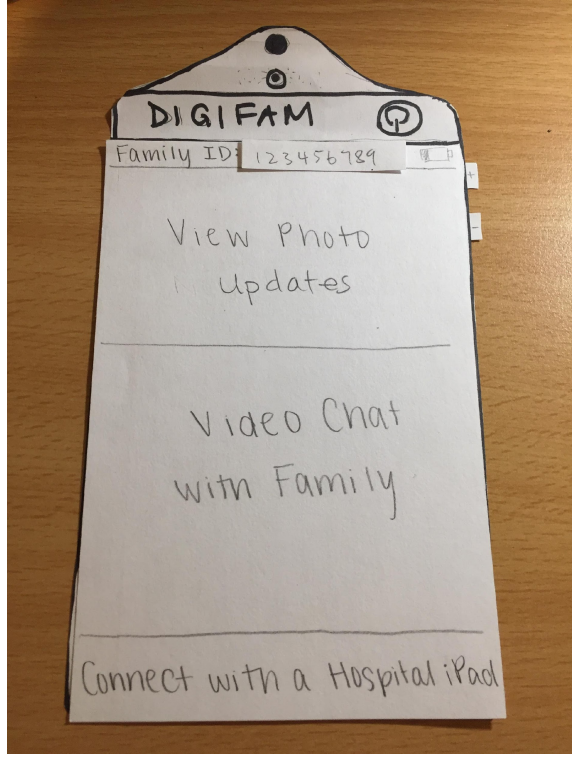
Issue #3: a way to adjust the volume [Severity 4]

The user didn't have a way to adjust the volume, so we added volume buttons to the side of the device marked with a "+" and a "-". These buttons are reasonably large and stick out clearly from the side of the DigiFam.

Original Design	Revised Design
	

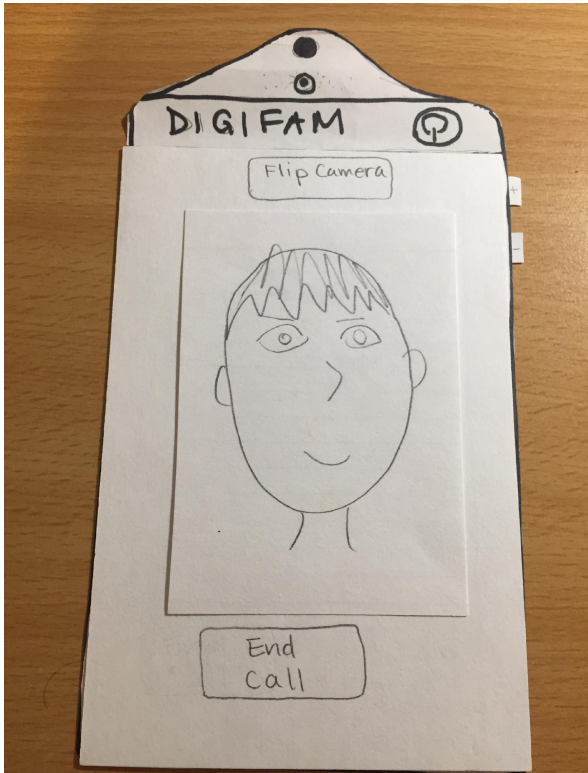
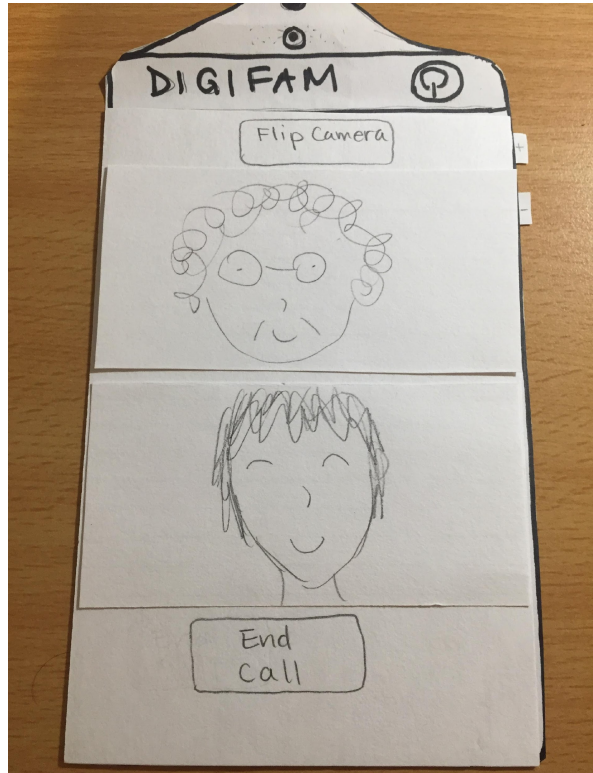
Issue #4: no way to check battery level [Severity 4]

The user didn't have a way to check the battery level, so we added a battery level indicator to the top right corner of the screen.

Original Design	Revised Design
	

Issue #5: video chat screen [Severity 4]

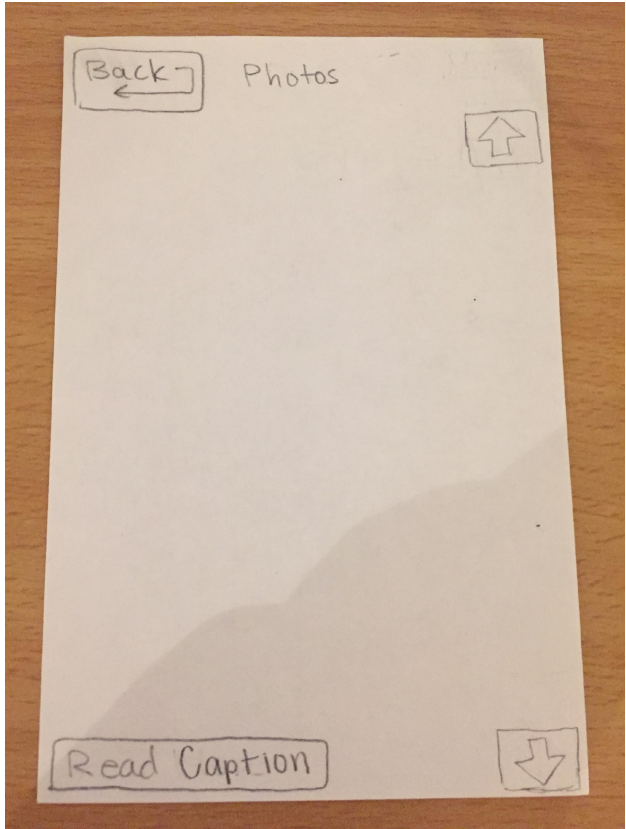
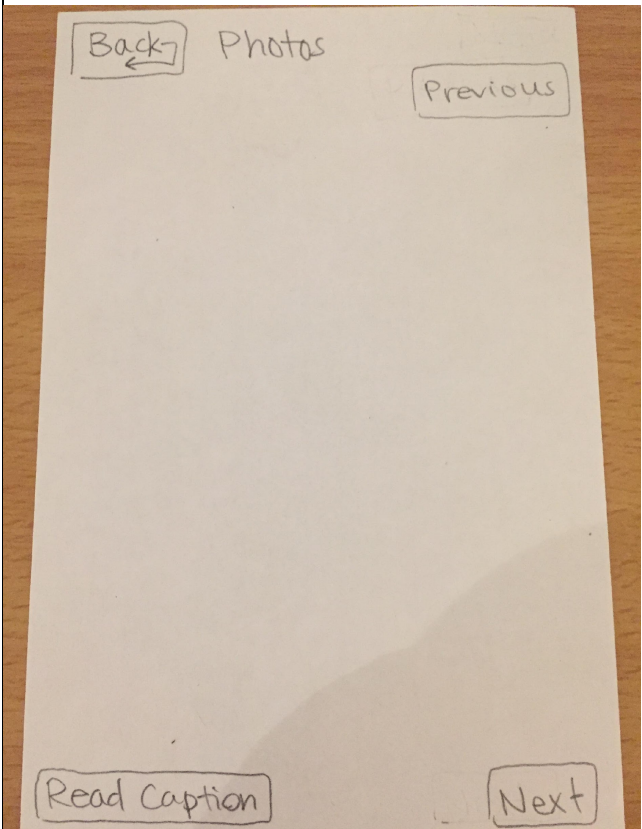
A participant noticed that when in a video chat you cannot see yourself at all, so there is no way of knowing whether or not you are on the screen. This also helped us realize that if a user is to flip the camera and show the person they are chatting with something there is no way for the to see if they are actually showing it. Our solution for this is to have the video chat screen be split in half. One half is of the user and the other half is who they are chatting with. We talked with the user about how seeing the person they are chatting with is the most important and they would like their picture to be larger. However, given the age of our target group solving this by having the users image be much smaller in the corner isn't realistic because our target group has trouble seeing the small screen.

Original Design	Revised Design
	

Design Critique:

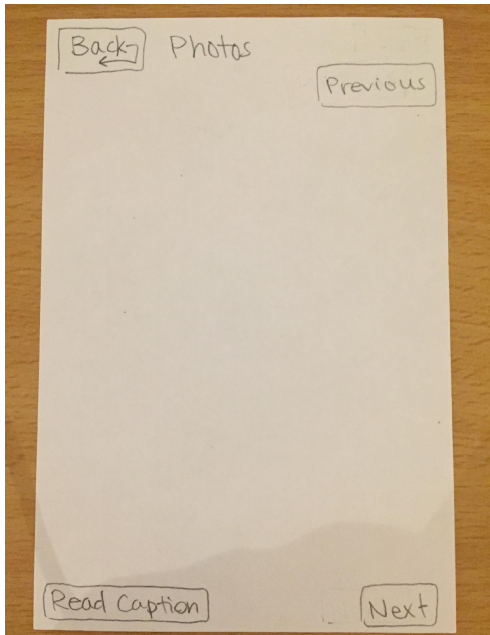
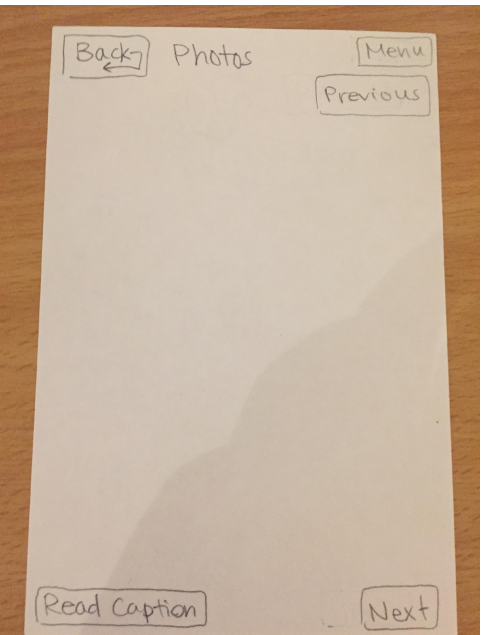
Issue #1: changing the up/down arrow buttons on the photo feed [Severity 2]

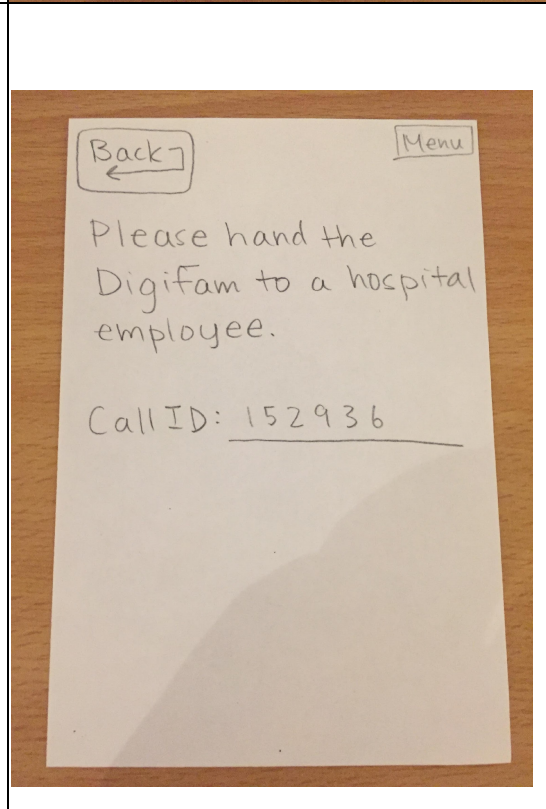
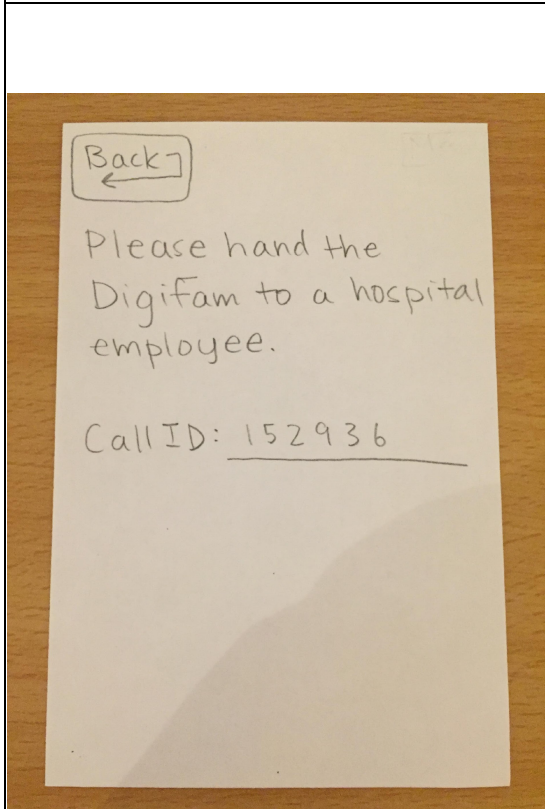
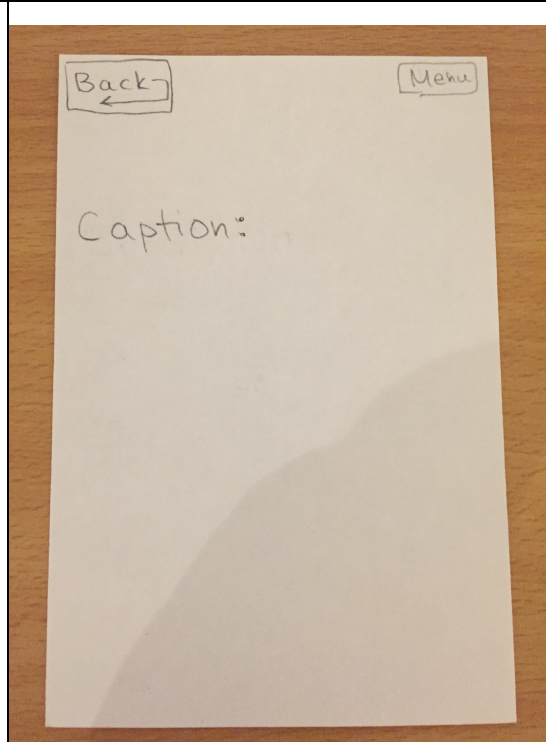
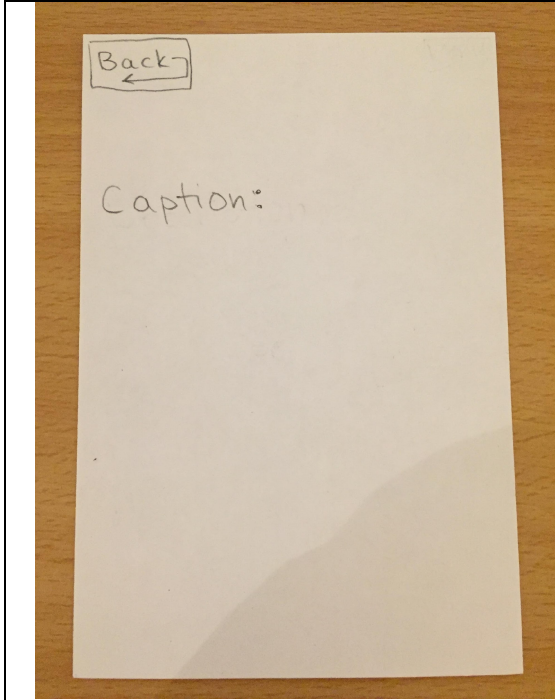
A critique we received was that the up/down arrow buttons that navigate to the next/previous photo were ambiguous. To make their meaning clearer, we changed the arrows to text labels – “Previous” to replace the up arrow and “Next” to replace the down arrow.

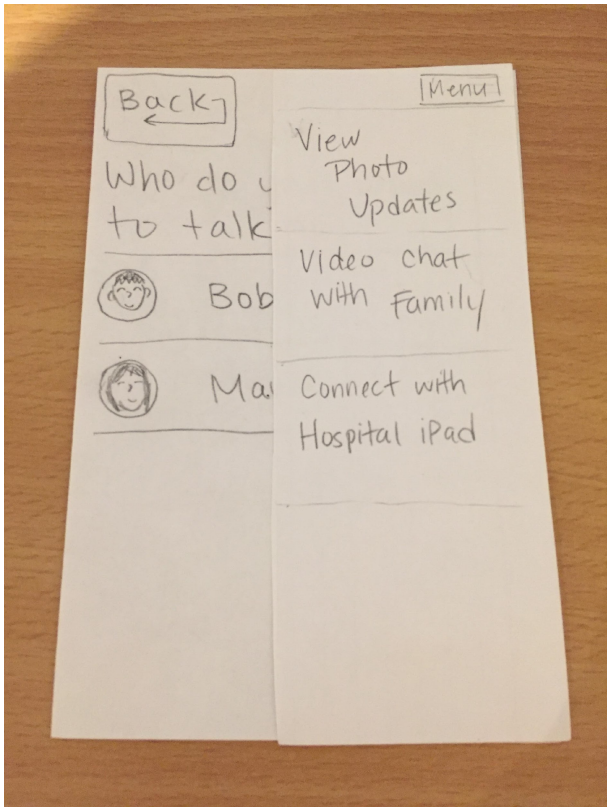
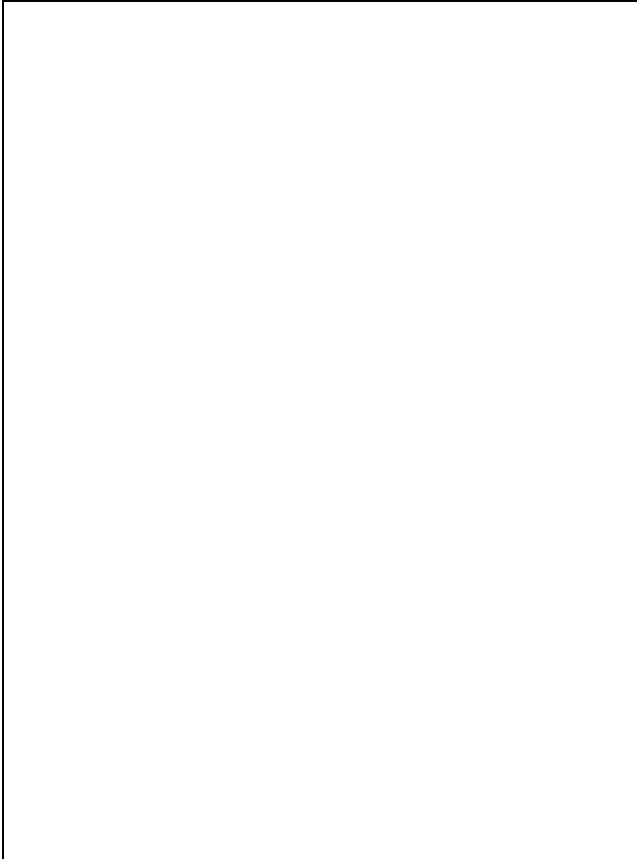
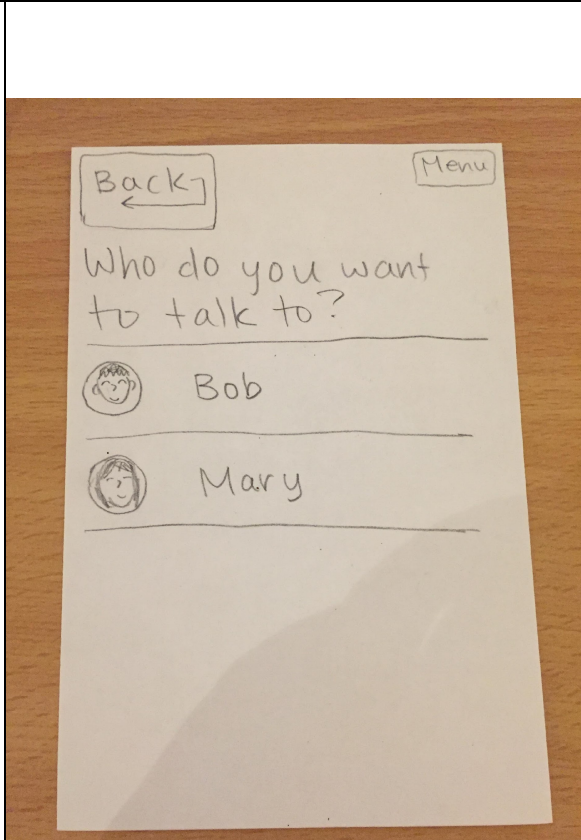
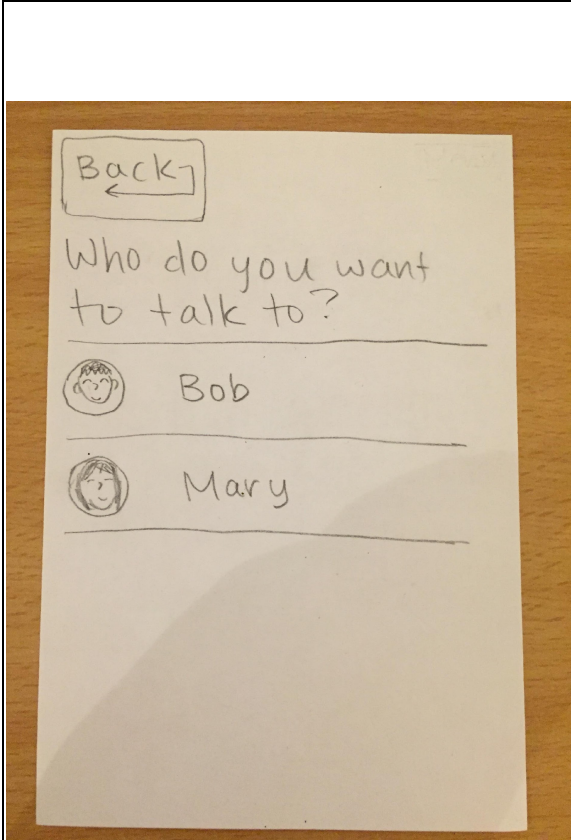
Original Design	Revised Design
	

Issue #2: less linear navigation [Severity 4]

Currently, it is difficult to navigate between functions (photo updates, video chat, connect to hospital iPad) because the user has to constantly use the back button to navigate to the main menu. To improve the efficiency of navigating around, we added a hamburger menu (labeled "Menu") to the top right corner of some screens. Once touched, a menu slides out with the three options that can be found in the main menu.

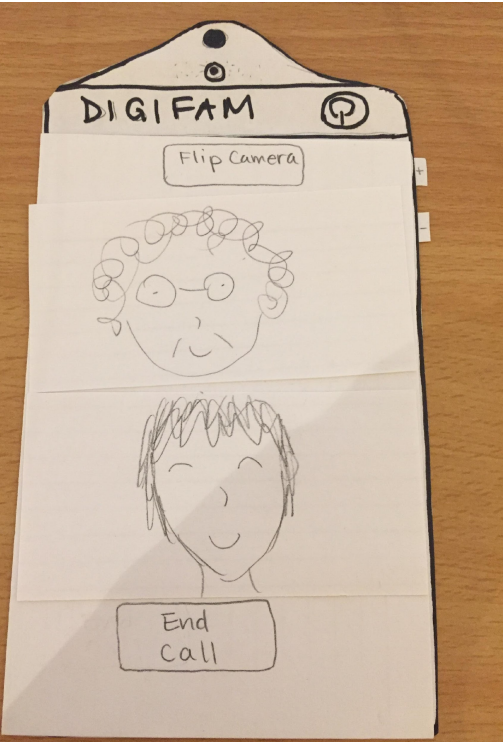
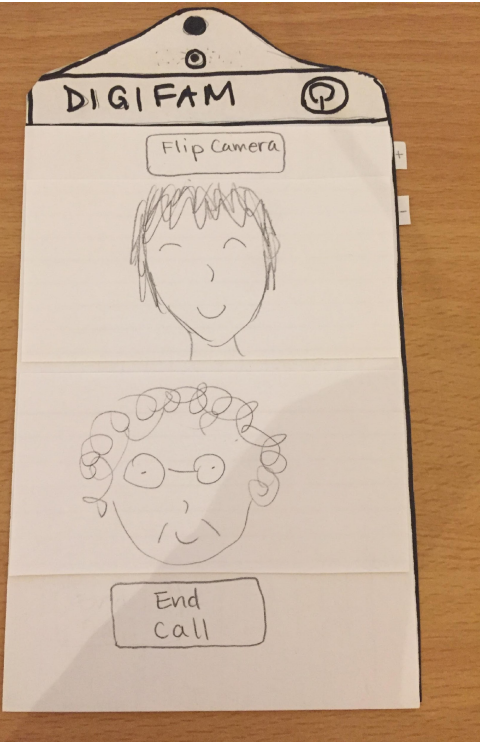
Original Design	Revised Design
	





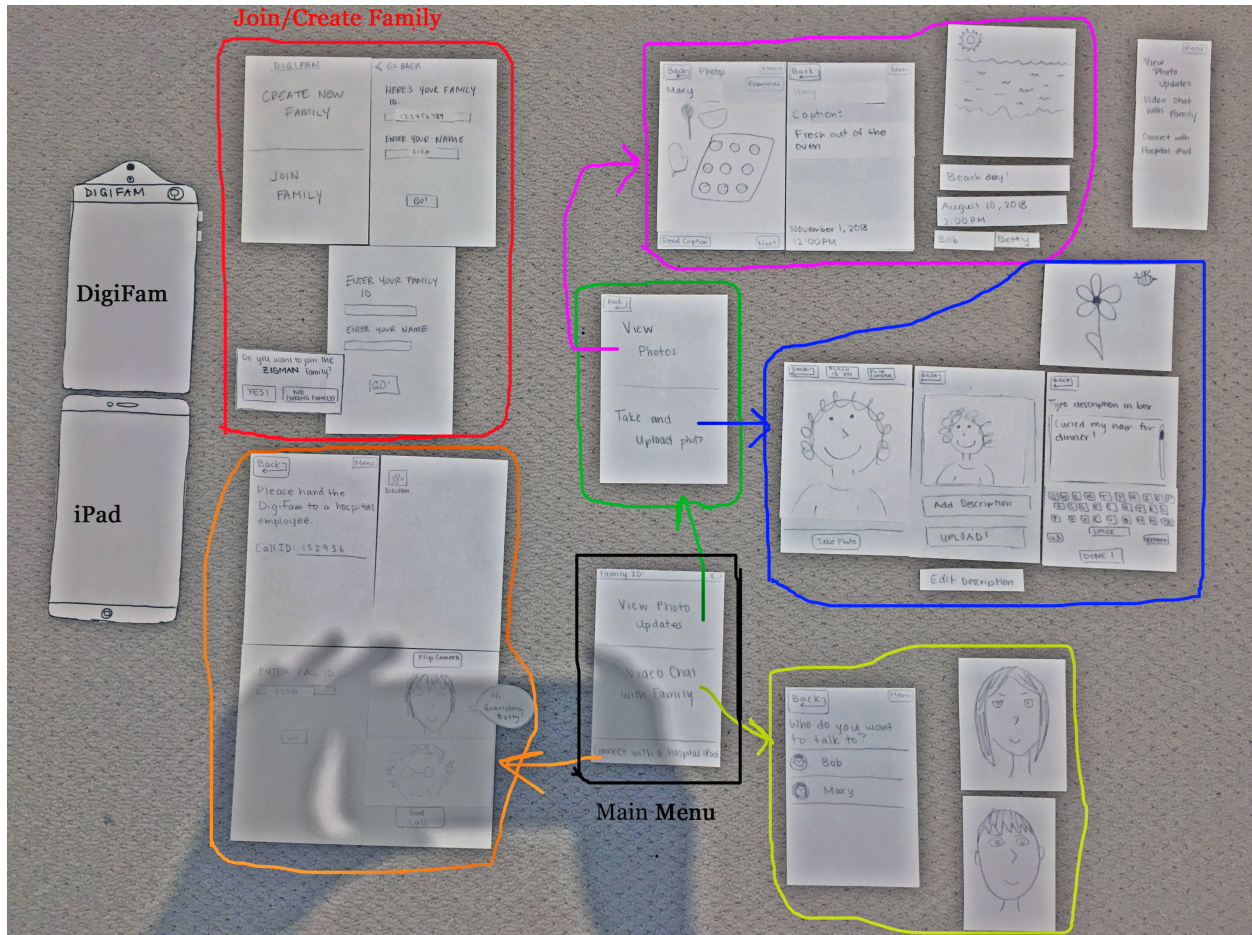
Issue #3: having the user displayed on the bottom half of the video chat screen [Severity 1]

Currently, during a video chat, the user is displayed in the top half of the screen and the family member is displayed on the bottom half. This is an issue because the camera is on top, which means that the user would be looking down at the family member instead of at the camera. We changed it so that the family member is displayed in the top half, closer to the camera, while the user is displayed in the bottom half.

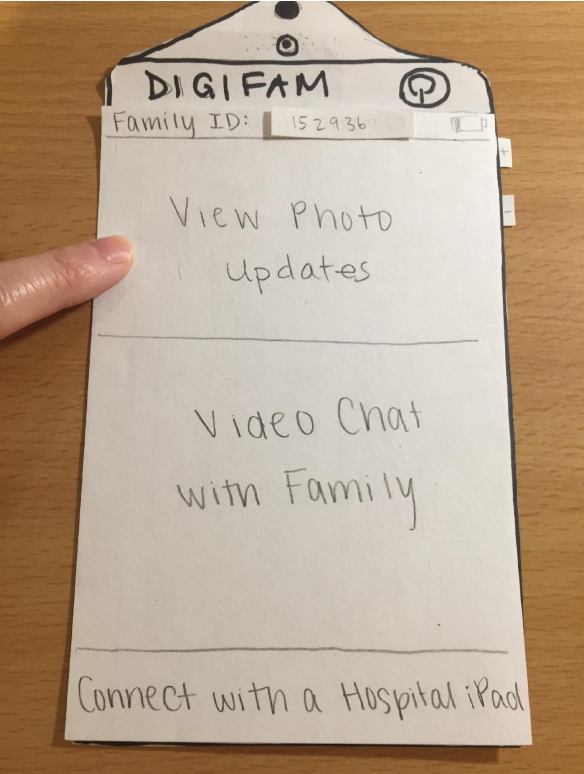
Original Design	Revised Design
	

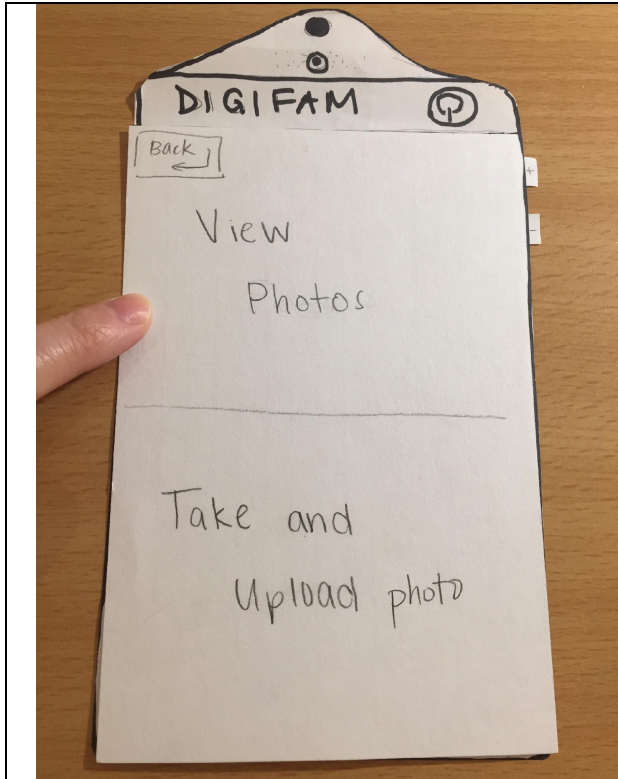
Final Paper Prototype

Overview:

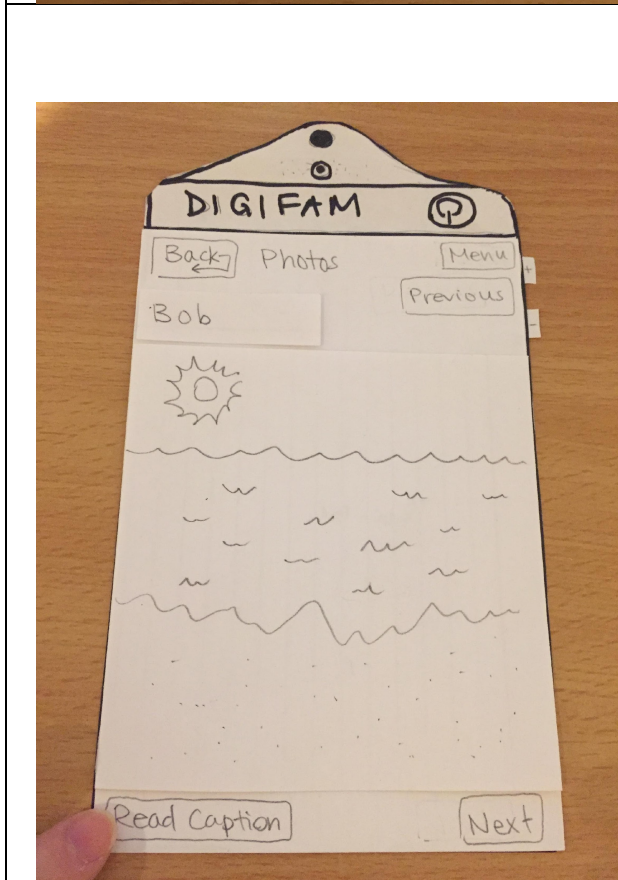


Task 1: Viewing Photo Updates

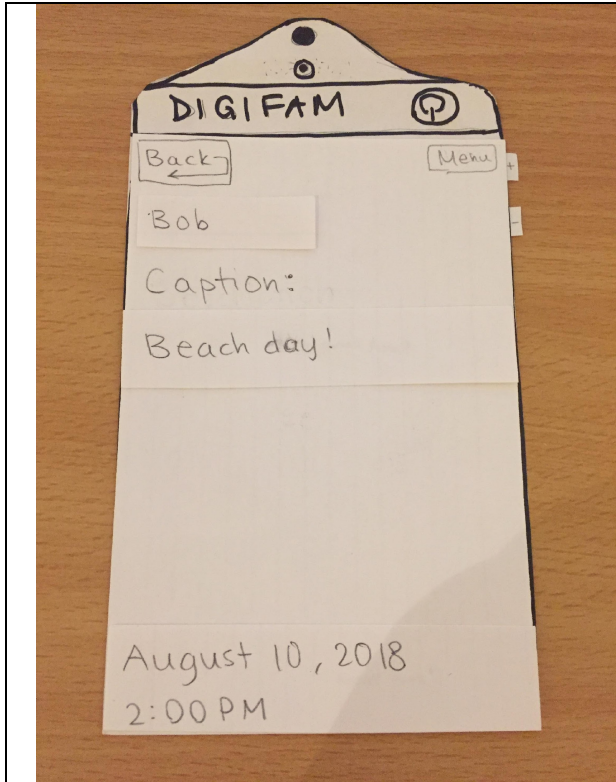
Picture	Description
	Pressing "View Photo Updates"



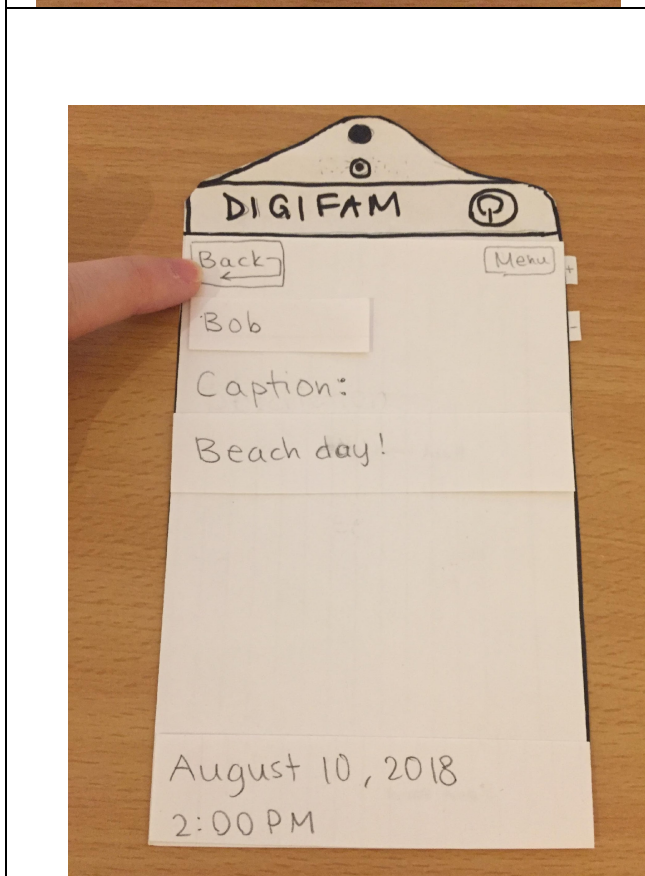
Pressing "View Photos"



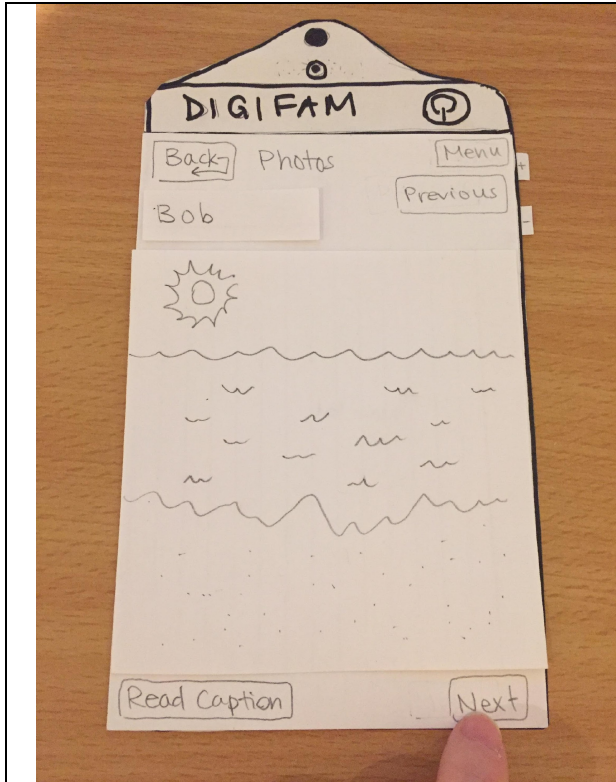
Looking at the first photo in the feed, then pressing "Read Caption"



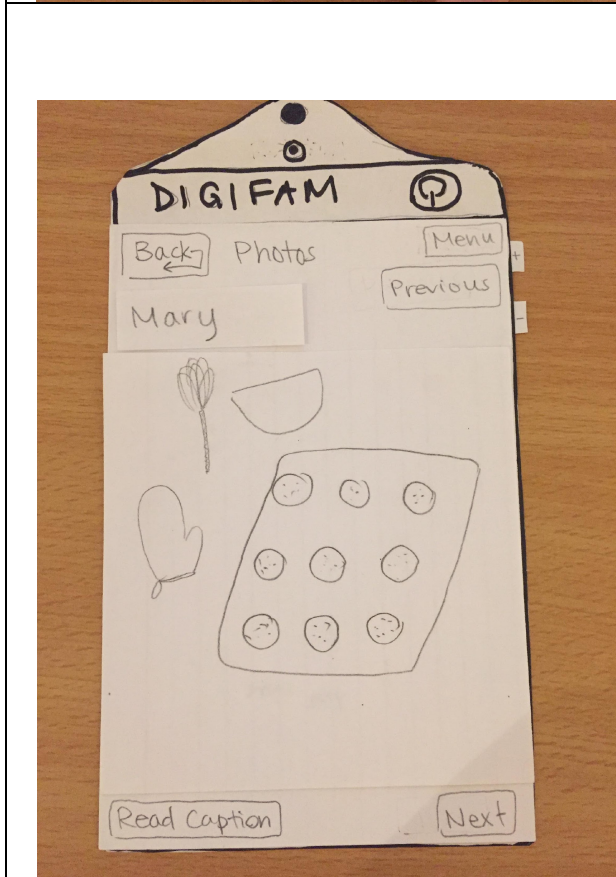
Name, caption, and date of post is displayed



Pressing "Back" to return to the Photos page

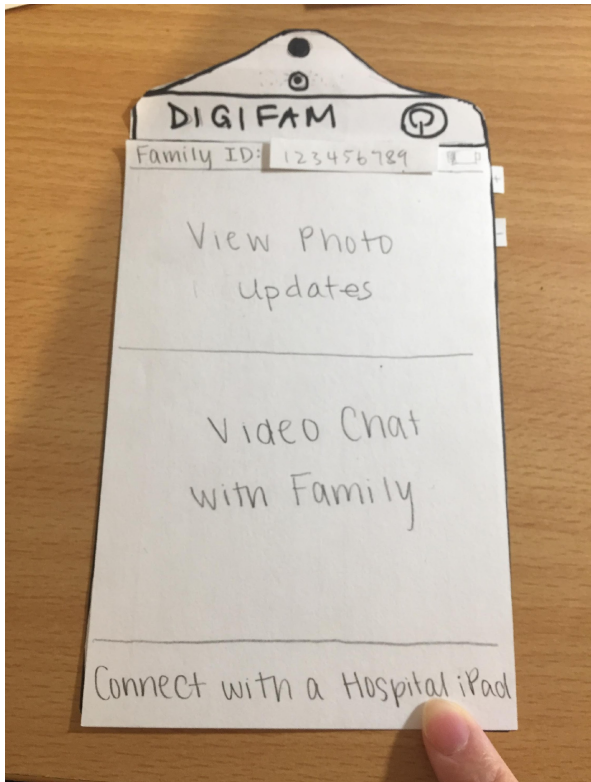
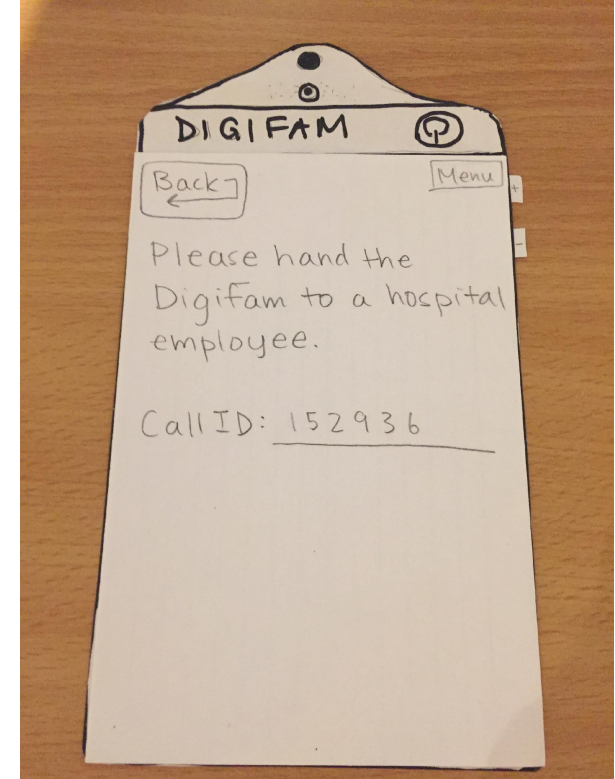


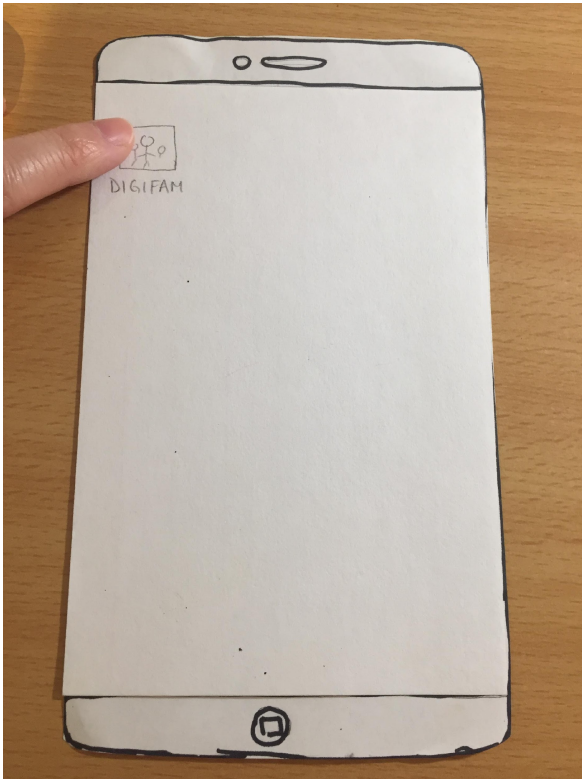
Pressing the "Next" button to go to the next photo



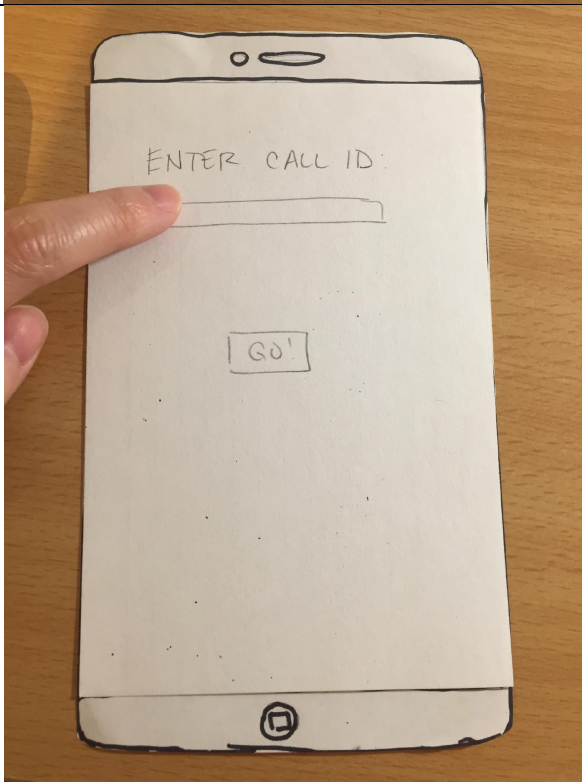
Looking at the second picture in the feed

Task 2: Connecting to a hospital iPad during a hospital visit

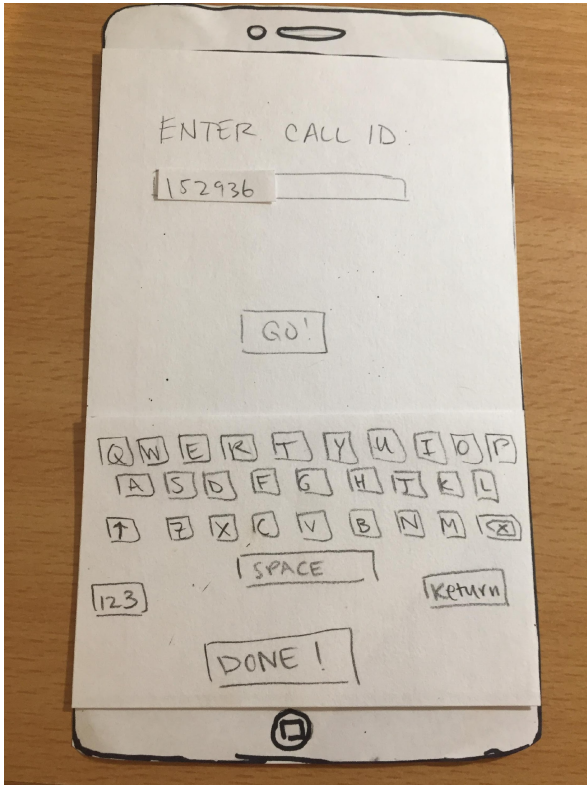
Picture	Description
 <p>A hand-drawn sketch of a device screen. At the top, it says "DIGIFAM" with a circular icon to the right. Below that, it says "Family ID: 123456789". The main content area has three sections separated by horizontal lines: "View Photo updates", "Video Chat with Family", and "Connect with a Hospital iPad". A finger is pointing at the bottom of the screen.</p>	<p>Pressing "Connect with a Hospital iPad"</p>
 <p>A hand-drawn sketch of a device screen. At the top, it says "DIGIFAM" with a circular icon to the right. Below that, there are two buttons: "Back" with a left arrow and "Menu" with a right arrow. The main content area has a prompt: "Please hand the DigiFam to a hospital employee." followed by "CallID: <u>152936</u>".</p>	<p>The screen displays a unique CallID and prompts the user to hand the DigiFam to a hospital employee.</p>



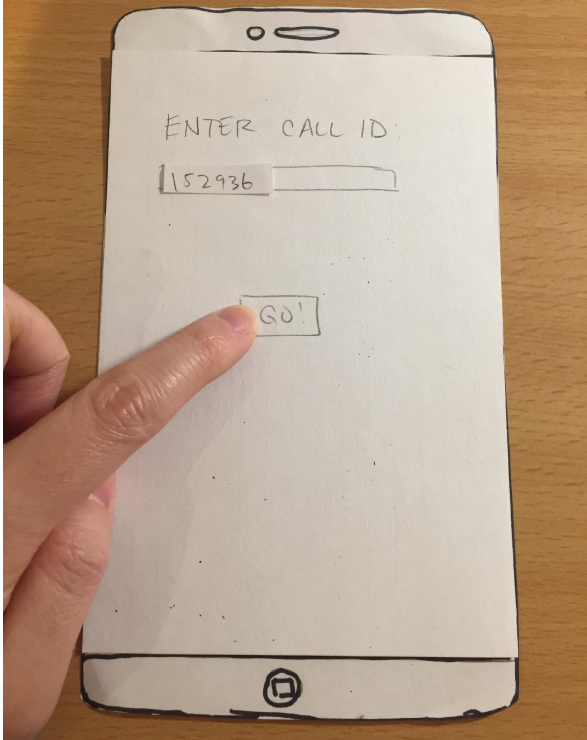
On a hospital iPad, an employee opens the DigiFam companion app.



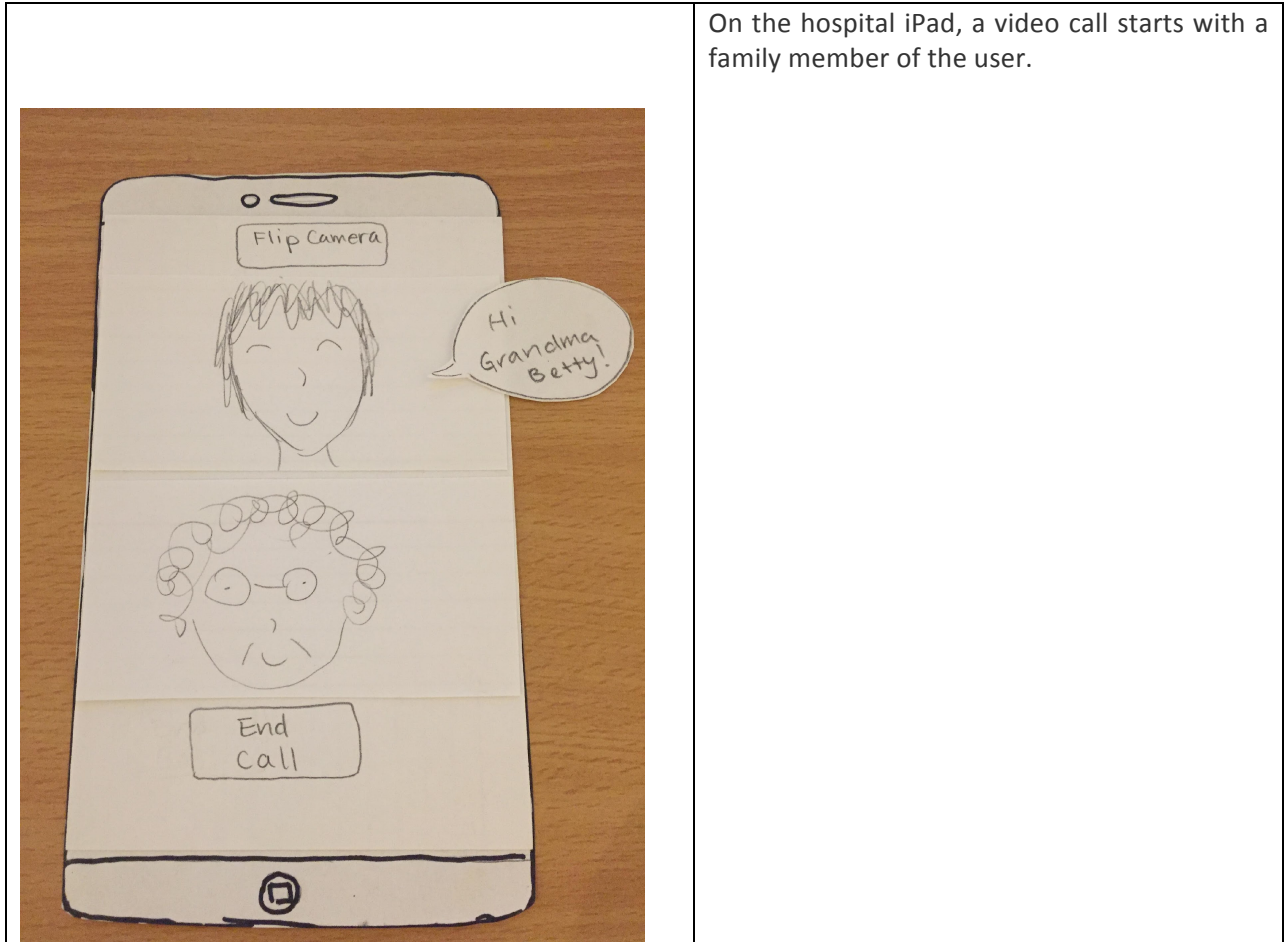
The hospital employee touches the text field on the hospital iPad.



The hospital employee enters the same CallID that was displayed on the DigiFam.



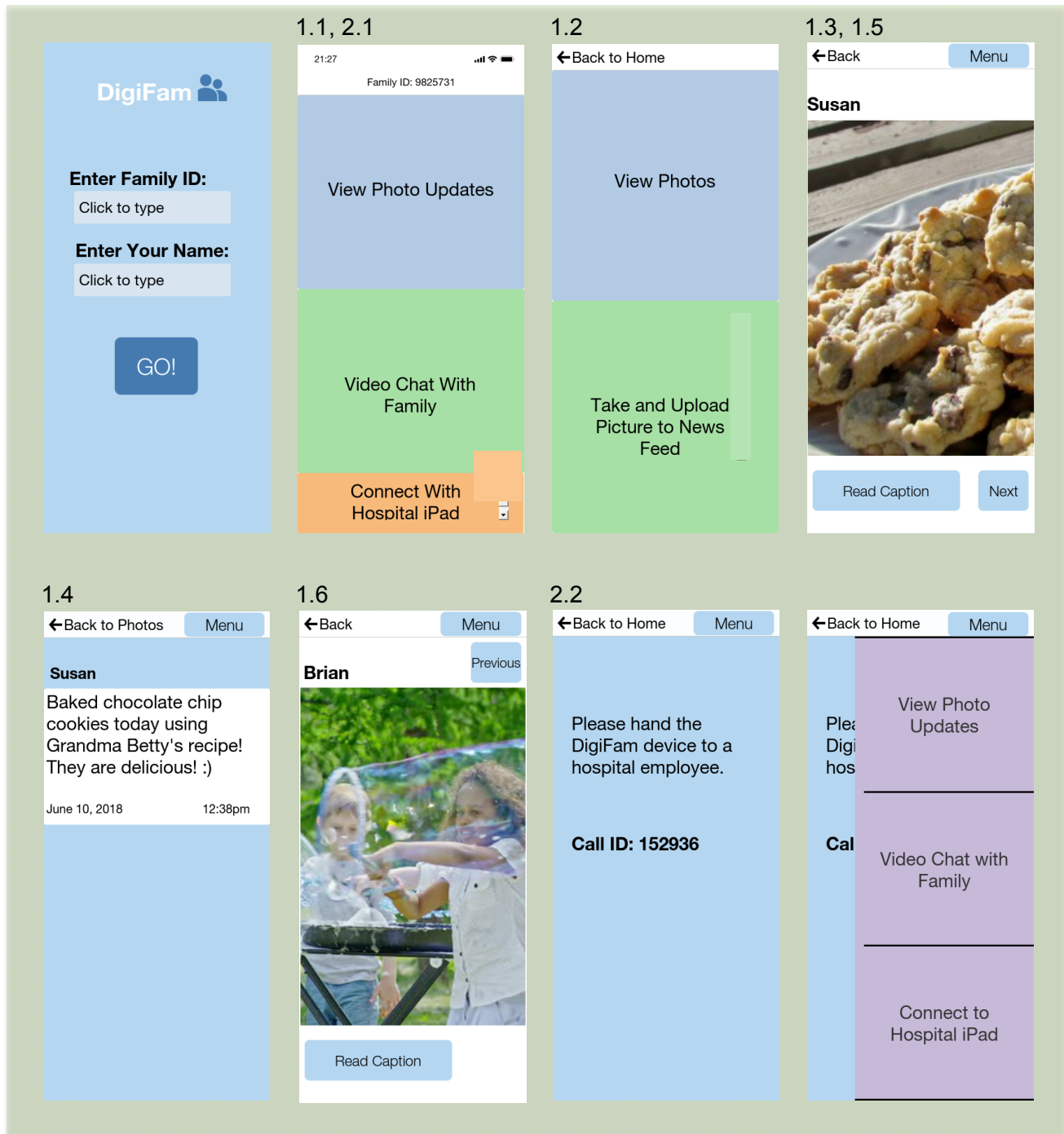
The hospital employee hits "Go!" to connect to the DigiFam



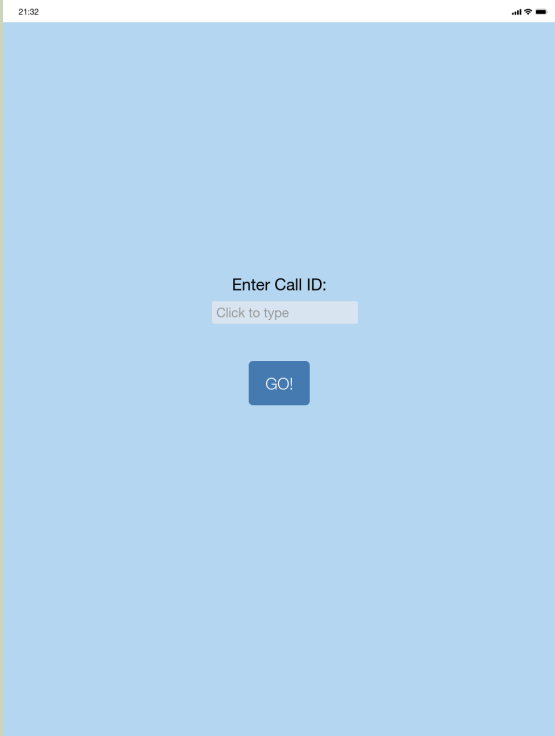
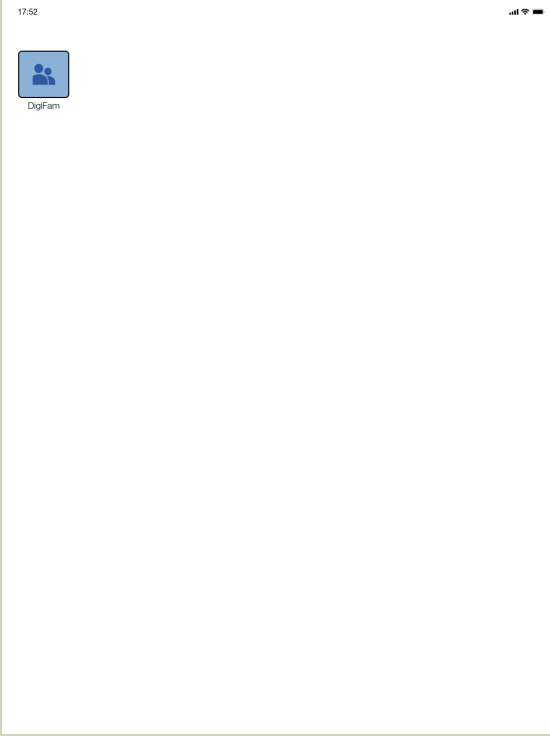
On the hospital iPad, a video call starts with a family member of the user.

Digital Mockup

Our digital mockup closely resembles our final paper prototype. The only changes we made had to do with color choices and font size. We worked on choosing colors that are easily distinguishable amongst others, and that many elderly people still can see clearly. We also were unable to make all font sizes as large as we had hoped because of several restricting button sizes. (Tasks are marked with numbers)



The first image on the previous page shows the sign in screen and the screen in the bottom right shows what happens when the “menu” button is pressed. The following images show the paired hospital iPad app.



In response to critiques, we changed the buttons on the photos pages from up and down arrows to the words “previous” and “next”. We made this change because we received feedback that said the user was initially confused about what the buttons did. We also increased font size where ever possible. For some cases, such as smaller buttons, this was not possible but in any other case we enlarged the text.

Our design supports our first task of helping elderly connect more with their family’s daily lives through our photos feed feature. By having a simple version of many modern day social media platforms, we have created a space where family members can post photos with captions about their daily lives. The elderly user can view this feed and feel more connected to what their family is doing without feeling like they are interrupting or burdening them with something such as a phone call.

Our design supports our second task creating a way for elderly people to have family accompaniment to hospital visits through our “connect to hospital iPad” feature. This feature also an elderly user to sync with a hospital iPad video chat which can then we wheeled with them throughout their visit. Our design focuses on simplicity and making this as easy for elderly users to learn how to use so to use this feature an elderly person clicks the “connect to hospital iPad” button and that directs them to a screen that informs them to hand the device to a hospital attendant who then inputs the call ID and wheels over an iPad that is now connected to a video chat with their family. This way an elderly person could be kept company by one of their grandchildren who may be at home or in a different state working on homework.

Discussion

What did you learn from the process of iterative design?

We learned that it is difficult to find participants for interviews and usability tests within a short amount of time. Our domain in particular was difficult because aside from relatives or relatives of friends, we did not know any elderly who could help us. We tried contacting nursing homes but due to their strict regulations, we were unable to secure interviews within a reasonable amount of time. We also learned the importance of user research in order to understand our target audience. Most people have elderly relatives and know in general the common challenges that the elderly face, but we found that talking to various people in our target domain helped us grasp their feelings and understand concerns that are still important but may not be as well-known. For example, we would not have known loneliness while attending checkups at the hospital was a concern if we had not done interviews and talked at length with people in our domain.

How did the process shape your final design?

With each usability test, we received more feedback and comments about our prototype. If we agreed that the feedback would improve the design, then we considered potential fixes to the problem and then either modified existing functions or added new ones to our design. In this way, our design improved and is now more efficient and clear. Sometimes we would receive negative feedback concerning parts of our design that had been modified due to previous feedback. In these cases, we needed to choose between two solutions. An example of this is the “Previous” and “Next” buttons on the photo feed. At first, there were no buttons because we assumed the user would know to scroll to see the next or previous photo. After the heuristic evaluation, we added a button with an up arrow to see the previous photo and a button with a down arrow to see the next photo. After receiving feedback that the meaning of the arrows was ambiguous, we added text labels, “Previous” and “Next”, to the buttons to make their function more clear.

How have your tasks changed as a result of your usability tests?

We changed the design of the main menu to three choices (view photos, video chat, connect to hospital iPad) instead of putting “connect to hospital iPad” in a submenu under video chat. This was because “connect to hospital iPad” was different enough from video chat that it did not make sense for both to be under the same main menu option. This made accessing the connect to hospital iPad function easier for users since they could see it from the main menu. On the video chat screen, previously the family member was on the bottom half of the screen while the user was on the top half of the screen. After receiving feedback we changed it so the family member was on the top screen instead because the camera would be on the top, meaning that the user would be looking down to see the family member instead of up at the camera. For the photo feed, we added “Previous” and “Next” labels to the buttons that swap between photos to make it more clear what they did. We also changed the “Read More” button to “Read Caption” to make the function of the button more clear.

Do you think you could have used more, or fewer, iterations upon your design?

Due to the limited time we had for usability tests, we were only able to find one elderly person to test our prototype on. For the remaining participants, we tried to find people who either had experience working with the elderly or people who had limited experience with technology. Even though these other participants were knowledgeable about the elderly or experienced a similar discomfort with technology that many elderly also experience, we feel that our design could go through more iterations if we had more participants specifically from our target domain.

Appendix

Script for introducing usability test to participant:

We're designing a device for elderly people who are lonely but close with their families. The device helps connect the elderly with their families. Based off of our research, elderly family members hope to stay updated with what their families are doing and they would to be around family members when they are sick or going on a hospital visit. We incorporated these tasks into our prototype for you to explore. First, try to view photo updates from your family. Second, pretend you are on a hospital visit and you want to use the device to connect to a hospital iPad so you can talk to your family during the visit.

Our incidents are recorded in the "Testing Results" section of this report.