Logera.

Team Members

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Paper prototyping, usability tests, revisions, reports, and digital mockups were all each done in part by all members of the team.

Problem & Solution Overview

The problems facing travelers are as diverse as the travellers themselves. Everything from the purpose and means of travel, to the travel destination shapes a travelers experience and puts upon them differing needs. One problem we have found through our research, however, that remains consistent across these different dimensions, is the need and love to document travel through photos and collection of data (such as where they visited, where they ate, etc…). As we heard frequently, it is import to travelers that the way they document their trip information not interrupt the experience of living in the moment. To address these problems and needs, we have designed a smart camera with a built in smart assistant. We chose a physical, stand alone camera because it is both a familiar device to many, and does not come with the burden of constant notifications that smartphones do. This enables our users to still exist in the moment during their trips while using our device. As for the smart assistant, it allows for a more interactive documentation experience that feels as comfortable as speaking with a close friend. We believe that these key aspects of our design will meet the needs and desires expressed by our participants during our extensive design research.

Initial Paper Prototype

Our initial paper prototype was a combination of a cardboard model of a camera and a series of notecards with interfaces drawn on them. The note cards were interchangeable on the back of the camera, and as the participant in our usability students moved through the tasks we interchanged the notecards to reflect their actions.

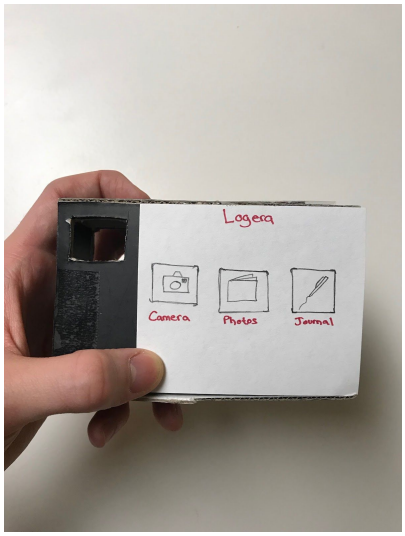
The critical aspects of our design are focused on our two primary tasks, taking and annotating a photo, and journaling at the end of a day of travel. The camera comes with a menu which allows a traveller to choose between taking a photo and journaling.

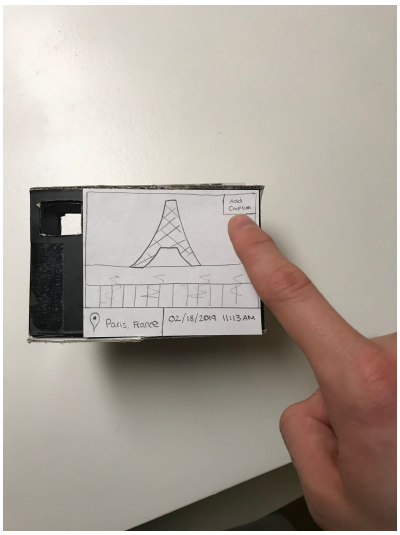
The camera aspect of the design allows travellers to take photos in a similar fashion to conventional camera. However, after a photo is taken it includes meta information such as location and time. If the traveller would like to set an audio annotation they can click a button on the photo and record an annotation.

The journaling aspect of the design allows a traveller to record an audio journal entry without the hassle of writing their thoughts on paper. The audio assistant will also make the journaling experience more engaging by providing prompts and photos from the traveller's day. The traveller can create a new journal entry by navigating from the landing page menu.

Primary Task 1: Using digital photos to document moments during a trip with ric contextual information.

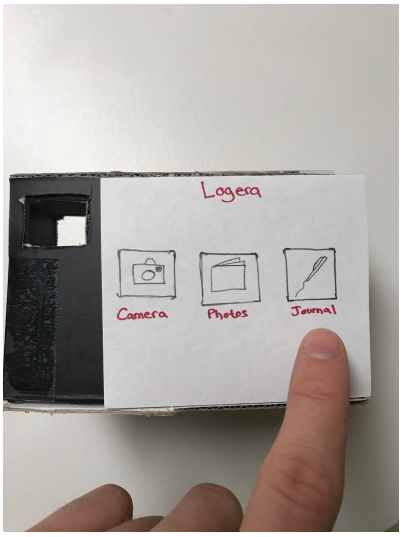
In task 1, the traveller selects the photo icon, takes a photo, and is then able to create an auido annotation for the photo.





Primary Task 2: Journaling thoughts and experiences after a day of traveling.

In task 2, the travellers journals about their day of travelling by talking to the Logera smart assistant. Throughout the journal entry the smart assistant prompts the traveller with questions and photos from their day.



Testing Process

For our usability tests we tested a variety of participants, each with their own unique travel experience. Our first participant was a senior at the University of Washington, who had recently travelled. Our second participant was a junior at the University of Washington who had very little prior travel experience. Our third participant was also a junior at the University of Washington who is interested in photography and will soon be studying abroad. We chose these three participants to represent different demographics of travellers and expose our design to participants with a variety of experience levels.

The protocol for our initial usability tests can be broken down into three main phases. In the first phase, we informed the participant of the goals of our tests, and what we would be asking him to do. After confirming our participant was comfortable continuing with the test, we began phase two. Phase two focused on using the prototype to fulfill our first task - taking photographs of tourist destinations. For this, we projected large screen images of popular tourist destinations and asked the participant to take a photograph and add an audio screenshot, noting any pitfalls along the way. After doing this a few times, we moved on to phase three, where we asked the participant to fulfill our second task by journaling/recording captions after a day of traveling. Again, this was repeated a few times before we concluded the test. Throughout the testing process one team member acted as the facilitator, another team member acted as the computer, and the remainder of the team observed and took notes in a shared document.

Throughout our three usability tests we refined our testing protocol to make it more streamlined and informative. For our first test only two team members conducted the test. One team member acted as the facilitator and one team member acted as the computer. Both team members attempted to also take notes. However, we found observing and conducting the test to be challenging. Thus, for the remaining two tests we made sure to have at least four members present for testing. Two team members acted as facilitator and computer, and at least two team members observed. This update to the testing process made the final usability tests much more informative. In our initial test we also did not project any images, and thus when the participant went to take a photo they pointed the camera at something arbitrary in the testing room. To provide a more realistic experience we decided to project photos of popular destinations for the user to point the camera at. This was a small change, but it allowed us to better test the mechanics of actually taking a photo. From this change we found that the button on the top of the camera to snap a photo needed to be changed.

In hindsight our initial testing process was thorough, but required a few tweaks to get the most out of each test. Additionally, our participants were all computer science majors, and it would have been beneficial to expose our design to someone who is less comfortable with technology.

Testing Results

Heuristic Evaluation

By evaluating our prototype based on Nielson's heuristics, we were able to discover very simple design problems that we had not thought of while developing our paper prototype. It was extremely valuable to have these simple changes made before our user testing, because they were very straightforward modifications that would have detracted from the user testing if they were still present. The following are the key issues that we chose to change after the heuristic evaluation.

Visibility of system status

- The default screen did not show what the camera is pointing at when taking a photo, as most digital cameras do. To solve this, we replaced the home screen icons with physical buttons, and changed the default screen to be the camera view. This also helped maintain the convention that people are already accustomed to with their cameras.

Match between system and the real world

- When the user completed recording their caption, it was unclear how to stop, so we added a stop button that follows the convention for ending a recording.

User control and freedom

- The user was unable to redo a caption if the first one was unsatisfactory. To give them the ability to do this, we provide a "redo" icon when the recording is completed.
- It was unclear how to delete a caption, so we added a "delete" icon along with the redo icon from the previous issue.
- There was no button to go from camera back to menu screen, but this was also solved when we changed from digital menu buttons to physical buttons on the camera, because we added a physical "back" button as well.

Usability Testing

The usability testing we conducted provided much more in depth understanding of how people actually interact with our product. We were able to observe what actions were extremely successful for people, as well as what actions were challenging or caused confusion. Many of the issues we identified during the three user tests overlapped which is why we combine the results below. These overlapping issues confirmed their validity and importance, and helped us to identify what issues were of higher severity. By observing these interactions and discussing the tasks with our users, we were able to make the following changes.

User control and freedom

- The user was unable to return to the photo-taking screen after taking a photo. We fixed this by adding a camera button to the physical buttons on the side, as well as the established convention of returning to photo-taking when the shutter button is pressed halfway.
- It was unclear how to leave the page when the recording was successfully completed, so we added a “done” button to the screen to allow them to close it.

Visibility of System Status

- There was no visible indication when a recording was being played back, so we added a “playing caption” icon to indicate the system status.

Aesthetic and Minimalist Design

- Our original paper prototype had three colored lights at the top to indicate the current status or mode of the camera, but during the usability tests we discovered that these were unnecessary and confusing to the user, so we removed these entirely.

Recognition Rather than Recall

- Based on our Heuristic Evaluation feedback, we added functionality to play, redo, or delete a caption after recording. The buttons we added to allow this were too small and unclear to our users, so we decided to replace them with the more commonly understood icons for play, redo, and delete, which allowed us to make them larger and clearer.

Design Critique

Our design critique provided a final high-level evaluation of our paper prototype. Many of the smaller issues that arose during this critique had already been addressed, but not yet implemented, through our user testing. The main high-priority issue that we focused on during this critique was addressing the interaction between the person and the camera while journaling at the end of the day. We felt that our prototype didn’t quite have enough development in the prompts that were being used for the journaling, which detracted from the user’s ability to really understand the experience of interactive journaling. Based on this feedback, we further developed our interactive journaling to include prompts not only based on location, but also specific photographs taken that day.

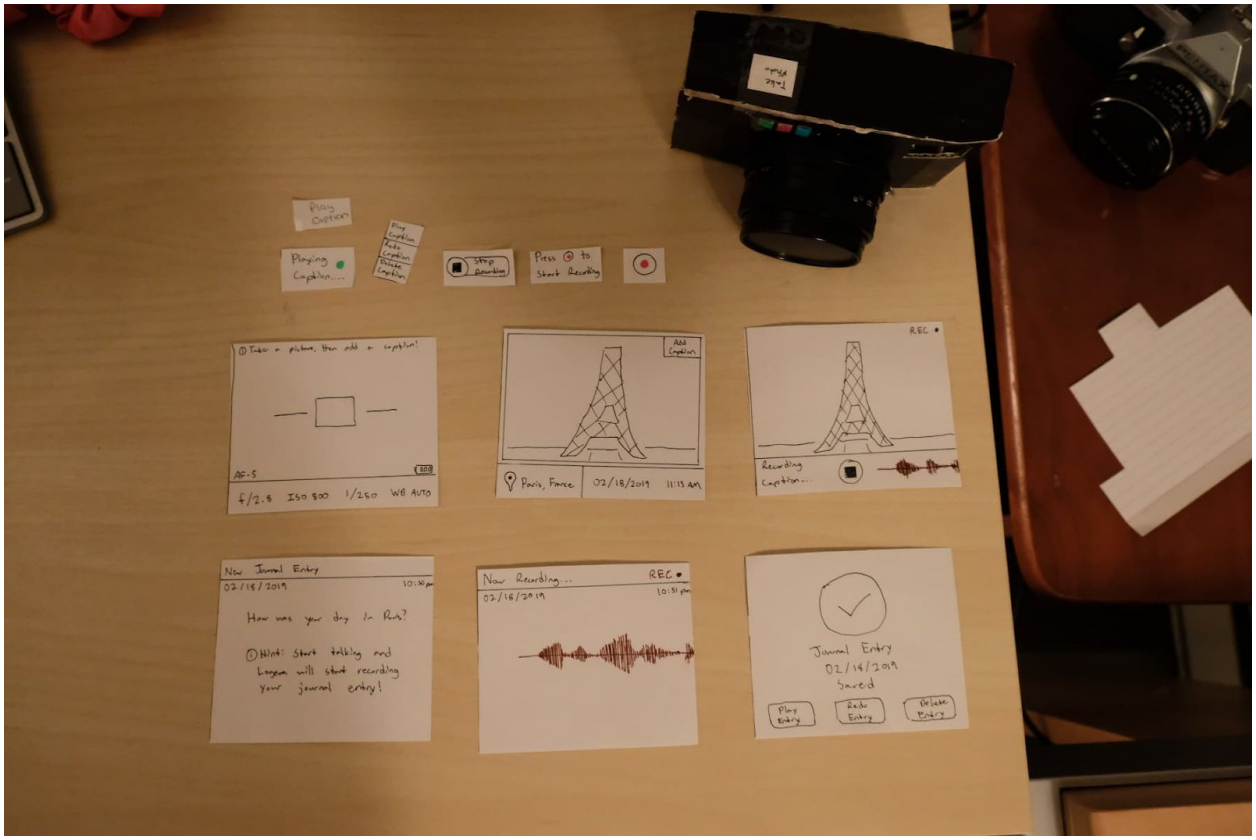
Final Paper Prototype

Our final paper prototype again utilized the cardboard camera model, but included some additional revisions to the interface screens and indicators. Many of our interface revisions involved making the different functions of the camera more intuitive to work with. Instead of forcing users to rely upon their recall of camera specific features, we adjusted the design to help them with recall. One specific example, was changing the design to have the icons match their functionality, such as a camera for the photo button, a house for a home button etc, instead of text based buttons. These changes helped give the camera's basic interface a more familiar and intuitive feel.

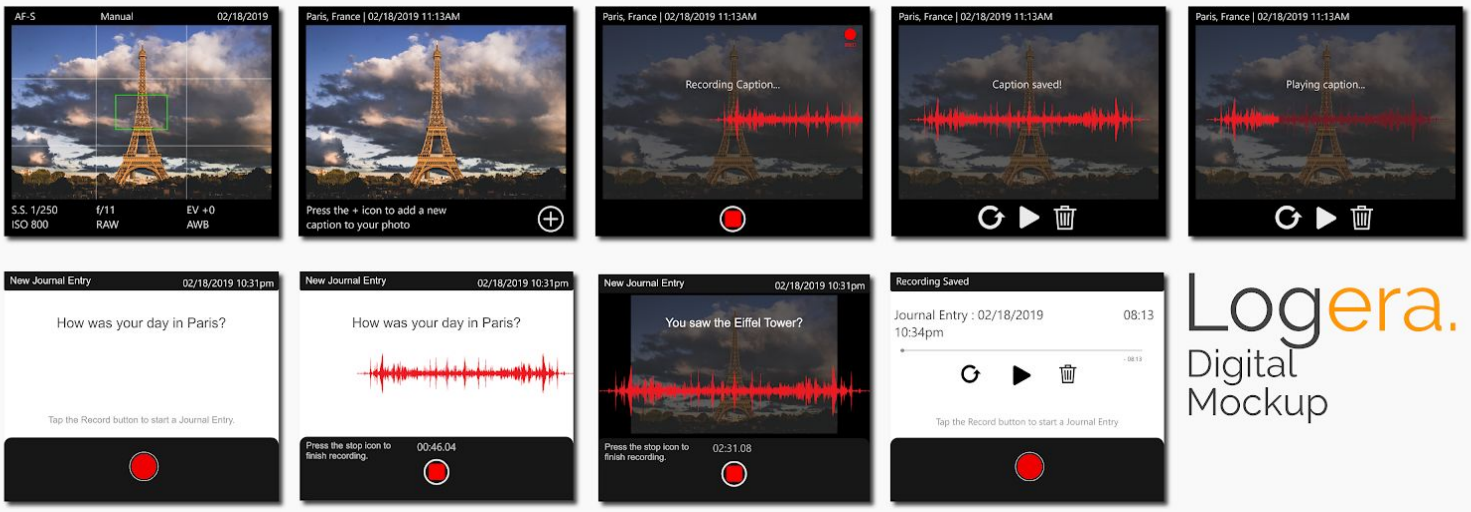
With respect to the first task, taking and recording photos during a trip, the final prototype attempted to make this experience more user friendly by allowing the user to have more freedom when taking a photograph. By increasing the size of the recording caption button as well as adding a toolbar for recording captions, a user is now able to have much more clarity is currently being used. Not only that, but the caption toolbar helps to give users more transparency in the process of recording captions, it is able to consolidate similar pieces of functionality such as recording, deleting, editing, and saving into one common usage space. At the same time the user is then given a higher understanding of the current state they are in amidst the recording caption process (through the more usable buttons and toolbar functionality)

In regards to the second task the main issue which the final prototype addressed was another issue of user freedom. Something which continually came up as an issue was users being unable to smoothly transition between different camera functions, as well as identifying which function they were currently in. In particular, this occured when users finished the journal task and were unsure of how to exit after completion of a entry. With the introduction of the function-shaped buttons, the camera, home, and arrow, it is now much more clear on how a user can transition between pieces of functionality at any point in the process making a smooth and quick experience through the overall usage of the camera. While the buttons were effective in clarifying transitions, including statements which describe the camera state "playing caption", "start recording", "done", in consistent locations the user is able to attain a better understanding of what task the device is currently performing for them as well increasing the usability and easy learning curve of the device.

Here is a concise overall view of the final paper prototype and the added functionality which were brought along with it (elimination of unnecessary components, added functionality clarification, increase in size of hard to use components etc.)



Digital Mockup



Our digital mockup emphasized refining visual elements from our paper mockup and developing the camera interface further. For the main camera photo functions, we chose a black background because black is the standard screen background for many digital cameras.

We chose to use an overlay with a faded image for caption recording screens and image prompt screens because we wanted to strike a balance between information shown but also accessibility of interface elements. Our paper mockups had buttons ending up too small to read so we decided to switch to icon based controls for our caption recording tools as well.

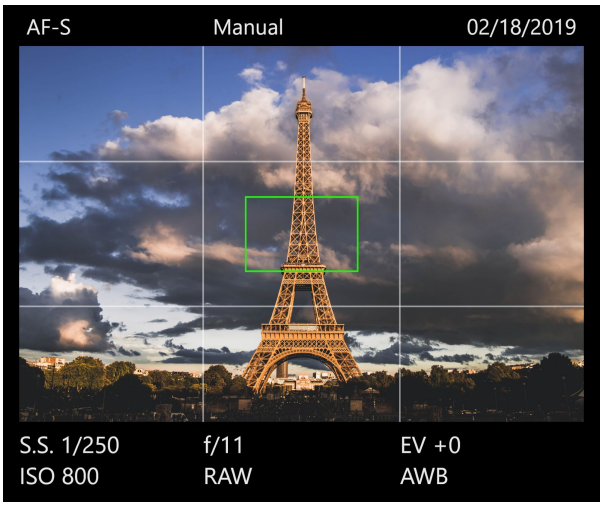
It should be noted that our digital mockup currently does not include a camera model as we felt that most of our functionality would be conveyed through the screen.

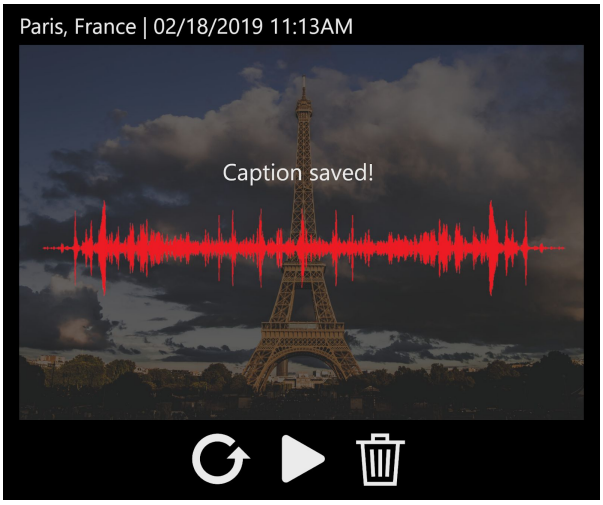
Our first task involves recording “in-the-moment” captions when photos are taken. Users will be given the option to add a caption to their photo on the photo review screen. After recording a caption, captions can be re-recorded, played back, or deleted. The visual caption indicator overlay will change depending on what is currently happening with the caption.

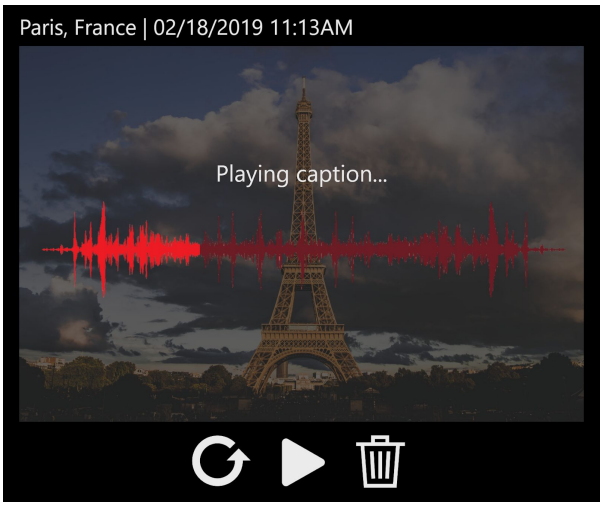
Our second task involves journaling vocal diaries assisted by prompts after a day spent travelling. Prompts will make use of contextual information such as photo location or the actual photo to inspire journal entries. This task will also allow for redoing entries, playing entries back, and also deleting entries.

Task One

Using digital photos to document moments during a trip with rich contextual information.

	From the default camera interface, the user uses the camera to take a photo.
	After taking the photo the user views the newly taken photo on the touch screen.

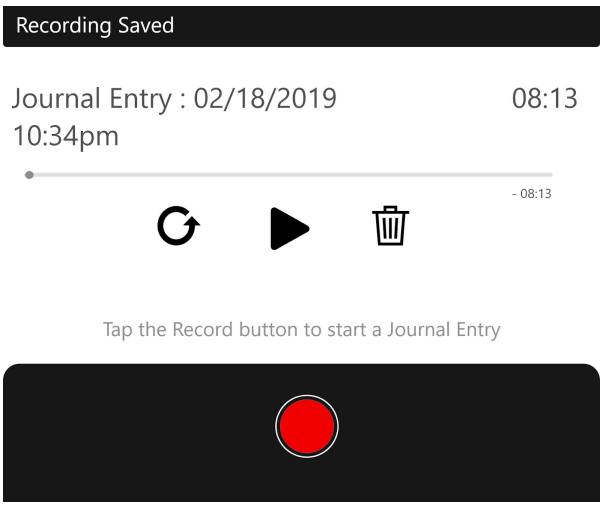
	The user clicks on the plus icon to add a new caption to the image.
	The interfaces changes to the recording interface. The user records their caption and then presses the stop button once they finish recording their caption.
	The interface indicates that the caption has been saved. There are options to redo the caption, play back the caption, or delete the caption.

	If the user chooses to play back the caption, the interface changes to indicate the caption being played.

Task Two

Journaling thoughts and experiences after a day of traveling.

	The journaling interface starts with a contextual prompt. To start recording, the user presses the record button.

	The prompt remains as the user records their journal entry. A visual is shown to indicate that a recording is currently in progress.
	As the recording continues, the prompt switches to one based on an image taken that same day. The user records an entry based on that image and then presses the stop button to stop recording.
	The recording is saved and the user is taken to a post recording page. From this page the user can redo the recording, play the recording, or delete the recording. The user can also tap the recording button to record a new entry.

Discussion

Throughout the process of iterative design we learned a few valuable lessons. The first was the importance of scoping your project / design to meet the natural constraints you are under. For us, we found that since travellers are so diverse, the needs and challenges they face are also diverse. We had to be mindful of this, and scope our project down to a few key tasks we feel most travellers complete. This was particularly important considering the time / resource constraints placed on us in an academic setting. Another important implication of having a diverse user base was the necessity to consider input from a variety of sources. Receiving diverse input - from participants and from members of our own research team - ensured that the device we built could serve our diverse users in well defined ways. Towards the end of the iterative design process, we learned the importance of keeping our design minimalist and simple. Our users taught us that they want a device that places emphasis on the primary focus of a camera - taking pictures - while also providing convenient access to the exciting features our design offers, such as digital logging. These lessons were valuable, and ultimately helped us shape a final we are confident will resident with our users.

The iterative design process and the lessons it taught us helped shape our design in a couple pivotal ways. The first was that it narrowed the scope of our project to only trying to solve the problems surrounding the taking of high quality photos and pairing them with metadata / digital logging. The second, was that the iterative design process led us to remove much of the unnecessary text-based user interface buttons we had, in favor of more familiar icons. This was important as we added additional system state indicators, so icons allowed us to do so without cluttering the interface. Overall, the iterative design process played a significant role in crafting our final design.

Our tasks remained relatively consistent throughout our usability tests. We attribute this to our tasks being well thought out for our target users. This was vastly helpful in the design process, as it allowed us to confidently focus on the aspects of the design that could better serve our users to fulfill these tasks.

We believe that we could have used a few more iterations upon our current design. More iterations would have allowed us to focus on learning more about how users interact with the voice assistant specifically. This is a key feature of our design, so more testing on it would be beneficial. There were also changes we made moving from the final paper prototype to digital mockup that we would like to ensure resonate with our users as we perceive they do. More testing would allow us to test that this is true.

Appendix I: Usability testing script

Introduction

Hello! Thank you for agreeing to participate in our usability test today. We are conducting an experience evaluation of our design.

Please keep in mind that this is an evaluation of our current product design, and not testing your abilities. If you would like to stop the evaluation at any point, please feel free to let us know. If you also would not wish to complete a certain task or answer a question, please feel free to let us know as well.

We would like to take notes throughout the evaluation. Please let us know if you would like to opt out of this. Throughout the tasks, we will ask you to think out loud and express thoughts, concerns, or anything that comes to mind while working through the tasks.

We will give you a scenario to set the stage for each task in this evaluation. We will go through each of the two tasks related to our design. Once we have finished with both tasks, we will ask some closing questions and then the usability test will be over.

Scenario

Imagine that you are on a trip abroad and are currently visiting Paris, France. You have brought your Logera with you to capture photos and log your trip.

Task 1

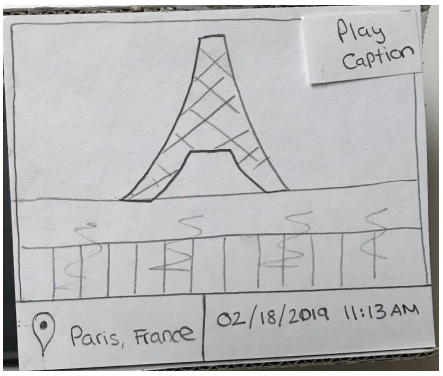
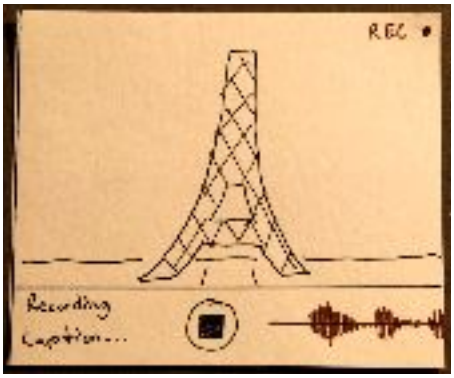
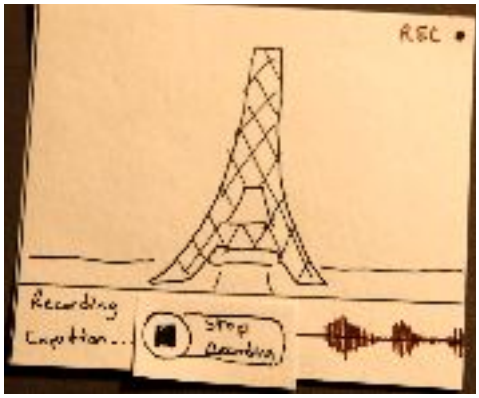
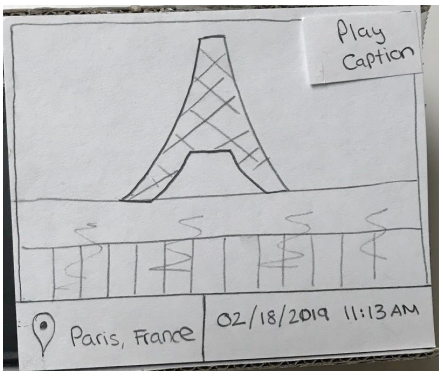
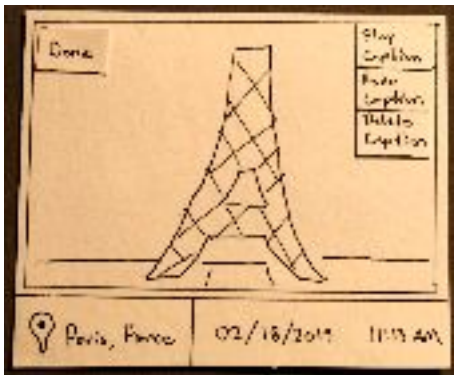
Please take a photo of a scene, add a voice caption to it, then play back the voice caption.

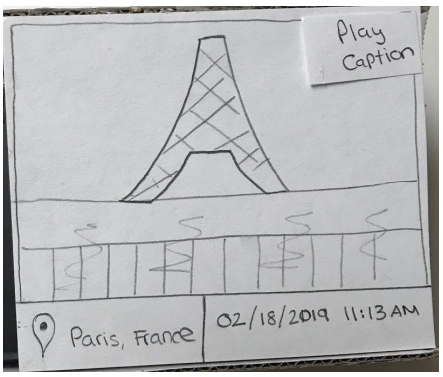
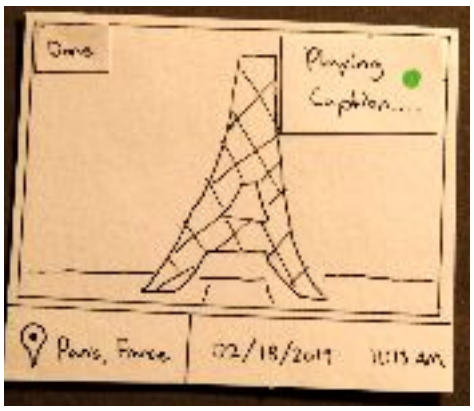
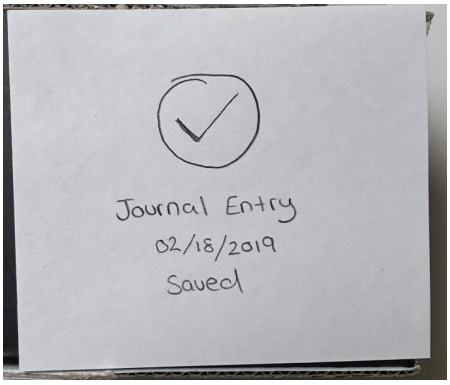
Task 2

Please start a new journal entry, journal a bit about your day, save the journal entry, and then play back the journal entry.

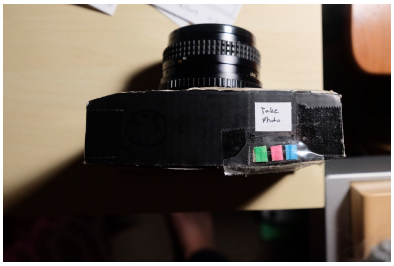
Appendix II: Usability testing incidents

Usability test 1

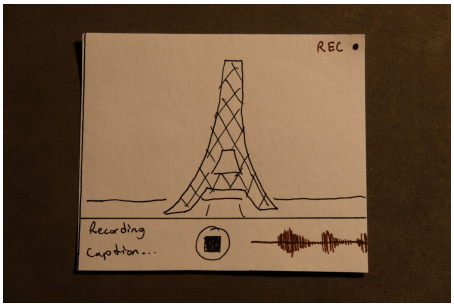
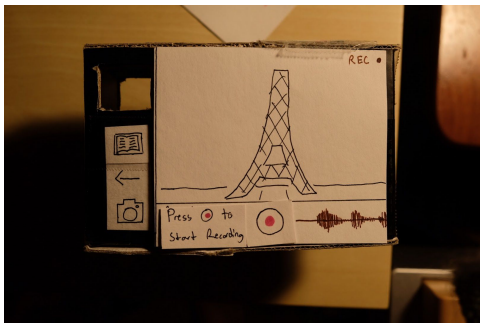
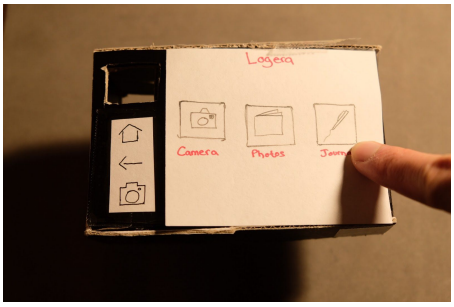
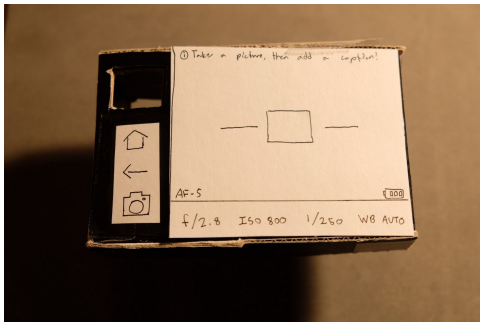
Before	Issue and Severity	After
	**User Control and Freedom** Unable to return to “taking a photo” after taking a picture. (4) **Solution**: Added a camera-icon button that is now constantly displayed.	
	**User Control and Freedom** Unsure of which button to press to stop recording a caption. (3) **Solution**: Change stop recording button to read “Stop Recording” after recording has been started.	
	**User Control and Freedom** Unsure of how to save the audio caption after recording. (3) **Solution**: Add a “done” button to the caption menu.	

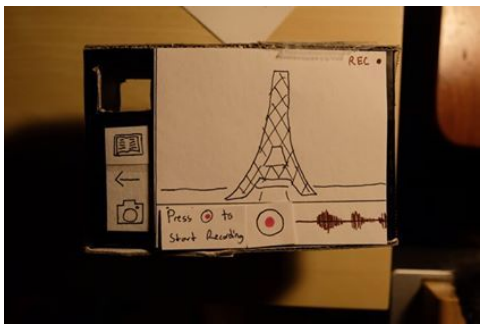
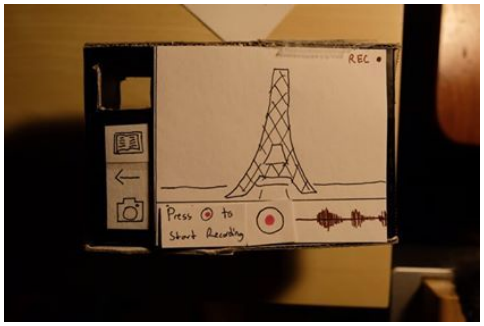
	**Visibility of System Status** Unable to tell if camera is playing audio when playing recorded caption. (2) **Solution**: Added indicator with text indicating audio being played which appears after “Play Caption” has been pressed.	
	**User Control and Freedom** Unsure of how to return to the home menu from the journaling screen. (4) **Solution**: Added a home icon button to take the user back to the home screen.	

Usability test 2

Before	Issue and Severity	After
	**Recognition Rather Than Recall** Unsure of how to snap a photo (4) **Solution:** Added a larger and more clean “Take Photo” button.	
	**Aesthetic and Minimalist Design** The purpose and functionality of the three lights at the top of the camera were unclear. (3) **Solution:** Removed the lights altogether.	

Usability test 3

Before	Issue and Severity	After
	**User Control and Freedom** Pause when ready to record. Surprised by the immediate start of the caption recording (3) **Solution**: Add an option to start recording the caption	
	**Match Between System and Real World** Design is very different from a traditional camera. Takes longer to take a photo. (4) **Solution**: Make initial screen default to taking a picture/ the camera screen	

	**User Control and Freedom** Recording button is to small making recording more tedious. (2) **Solution**: Increase the size of the recording button	
	**Recognition Rather Than Recall** Caption manipulation buttons are unclear on what functionality each of them does. (3) **Solution**: Make the buttons icons instead. They become smaller and are more recognizable.	

Contribution Statements

Alex (20%): Completed digital mockup and appendices of the final report.
Justin (15%): Completed the discussion part. Added various revisions/edits throughout final document.
Nick (15%): Completed the Final prototype portion of the final report
Maegan (20%): Completed the Testing Results portion of the final report.
Dylan (30%): Completed introduction, problem and solution overview, initial prototype and testing process sections.