

Home Messaging System

Midterm Project

INFO 564 – Prototyping for Interactive Systems

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PROJECT INTRODUCTION

CONCEPT ABSTRACTION (FROM ASSIGNMENT)

Recently, a national consumer electronics company released a product targeted to be a “home message center” that when idle, also operates as a digital picture frame to display your favorite photos. While the product scored well in market concept research, it has performed poorly in some early tests with a limited number of home users and struggled in the marketplace. The product is being reviewed for possible re-design.

PRODUCT PROBLEM SPACE (FROM ASSIGNMENT)

The product’s purpose is to facilitate convenient audio and written communications between members of an “on-the-go” household within a central location in the home. When idle, the device also operates as a digital picture frame to display your favorite photos. In an attempt to keep the product simple, only 4 buttons were incorporated into the industrial design. Due to cost concerns in the initial device release, the product did not incorporate touch-screen technology. The product, also in order to facilitate quick, ease of use amongst all members, has now incorporated a touch screen interface.

PRODUCT VISION

The vision for the product is to create a family-centered messaging system that will serve as a communication hub for all family members. The product will allow all family members to communicate asynchronously with others, as well as provide reminders for important events. The main goal of the product is to exchange current messaging systems — handwritten notes, whiteboards, phone messages, text messages, paper calendars, etc. — with the more versatile, technologically enhanced functionality of personal videos, creating a more dynamic, personal, interactive, and efficient method of communication between all family members.

FUNCTIONAL CONCEPT

PHYSICAL DEVICE

The messaging system device possesses a clean, easy to use design. The physical interaction is created using two physical buttons — one to leave messages, and one to access messages — as well as incorporating a touch screen allowing users to access the full functionality of the system. The device is approximately the size of a normal piece of paper (about 10 inches by 12 inches), and will be adaptable to either stand on a table or countertop or hang on a refrigerator or wall. The device is equipped with a video camera located on the top center of the product, allowing users to stand directly in front of the device to effortlessly leave messages.

PRIMARY SOFTWARE FUNCTIONALITY

The primary product function is for users to create, retrieve, and manage video messages. To accommodate this variety of user interface activity, the device software can be accessed using either the two physical device buttons or the touch screen interface. The physical buttons allow users to quickly create and retrieve messages without the need to delve further into the interface menus or advanced functions. In conjunction, the touch screen interface allows users all of the functionality of the device buttons, but also allows users a more robust feature set, including management of messages and advanced options.

Given that the device is always on, the video screen typically shows slideshows of pictures that users have loaded to the device, as well as an optional calendar display, showing the time and day. This screen will display a notification if an unread message has been recorded on the system, prompting a user to access the system and review pending messages. Through the software interface, users simply touch the notification screen to access the message functions. Users then can view new messages, create new messages for others, and navigate through other options.

SECONDARY SOFTWARE FUNCTIONALITY

The device is also equipped with advanced calendar and event functionality. As described in the primary software section, the device is always on, thus users may see a screen that displays both a slide show of pictures, and a calendar that displays the time, date, and additional options like pending and upcoming events. The inclusion of calendar functionality allows users to record and assign messages to specified days, creating reminder events. When a user saves a message, they will be prompted with options on how to save their message. By selecting a Save to Calendar button, users can then submit a date and other behavior necessary to save an event for a given day, thus further enhancing the messaging functionality to create asynchronous communication between members of the family.

INITIAL PROTOTYPE SKETCHES

DIAGRAMS



Figure 1: Example of Interaction Sketch (Paper Prototype)

See Appendix A for additional interaction sketches (paper prototype).

See Appendix B for initial prototype task flow diagrams.

See Appendix C for storyboard diagrams.

With a working belief regarding the product vision, problem space, and proposed physical locations of the device, the design team focused primarily on creating a device that may be used by a wide range of ages and technical skill sets, all within the context of a communal setting, such as a household kitchen or entryway. The design team opted to create a touch screen device that did possess a minimal number of physical interface buttons, while using both large buttons and interface icons.

The design team decided to utilize the entire possible space for a video touch screen rather than having copious amounts of available white board or physical frame space. This shifted the focus of the device from being a multimedia messaging system to a primarily video-based messaging system. Through exploration of these determined design elements, the design team created various versions of how best to represent our intended outcomes through the overall layout and design.

COGNITIVE WALKTHROUGH AND DIRECTION

The design team performed an internal cognitive walkthrough using our proposed paper prototype sketches. The team found most of the proposed ideas made sense. The major confusions were related to button and direction wording issues. An example of this was when trying to exit a submenu, as the label “Back” didn’t convey any changes made to that menu were being saved. Modifying the button verbiage to “Done” conveyed the message more appropriately.

We also found a few screens where the “Back”/”Done” button was not used but should have been. Thus, to keep a consistent flow within the user interface, the design team discussed the addition of a “Back to Slideshow” button would be an appropriate method to allow the user to access the picture slide show from the main menu.

To create a “Quick Message”, the user would press the “Quick Message” button on the device. To end the message recording we found that a user should also be able to press the “Quick Message” button as well as touching the screen itself.

After a message has been viewed, the team believed users may need a way to save a previously viewed message as new. This would give the user the ability to mark the message as “New” if the message was not directed to the user itself.

Lastly, having to adjust individual digits for setting the device time seemed overly complex. The team thought about how to simplify this process and adjusted the functionality with setting the hour, minutes and AM/PM with only one up and down arrow each.

DIGITAL PROTOTYPE DESIGN

DIAGRAMS AND TEST PREPARATION

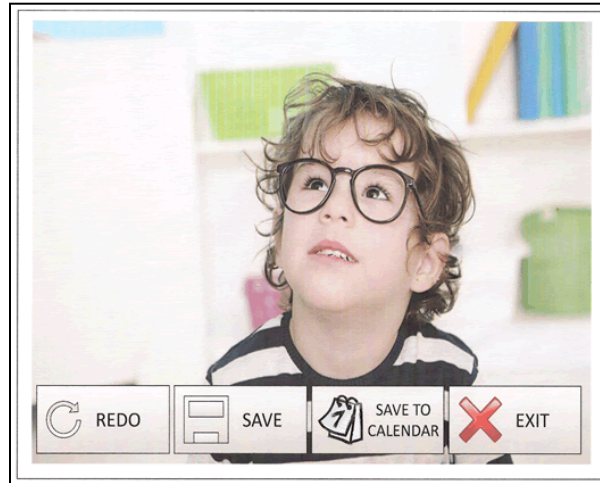


Figure 2: Screenshot of Digitized Interaction Sketch

See Appendix D for additional digitized prototype screenshots.

See Appendix E for refined screen flow diagram.

Highlight any significant changes between initial & digital prototypes, based on initial walkthrough.

The design team reviewed acquired notes from the initial walkthrough and created a flow of all proposed screens, allowing the team to concentrate efforts on creating proper screens to perform primary tasks with the new device and user interface. The screen flow provided a good baseline for further discussion in how device functionality can be enhanced further by eliminating screens deemed unnecessary for the given functionality. From this discussion, at least two screens were removed from the initial prototype, as their functionality was either out-of-project scope or combined with other existing screens.

Once the design team felt comfortable with the screen flow, a concentrated effort was made to recreate all user interface screens digitally within MS PowerPoint 2007. The design team reviewed these screens to assure no known task processes were omitted before conducting user walkthroughs. The team also created and reviewed tasks (and corresponding scripts) to test both primary and secondary device functionality, in order to acquire user input regarding future user interface directions the design team should investigate.

TASK WALKTHROUGH FINDINGS

See Appendix F for Pre-Walkthrough Script (Addressed to test subjects).

See Appendix G for Task Walkthrough Descriptions and Raw Data.

Each design team member found a volunteer to perform three tasks, as approved by the team. The three test subjects, while not representing a broad spectrum of age range, did have a varied technical comfort level and did have a theoretical reason to leave messages on the device itself.

- Single Female, appx. 30 yrs. old, living with a roommate, no children, technically savvy.
- Married Female, appx. 33 yrs. old, living with husband, no children, not technically savvy.
- Single Male, appx 27 yrs. old, living with a roommate, no children, very technically savvy.

A quick review of the key findings that were uncovered by the tests in whole reveal the following:

1. Users were able to review messages properly. However, all seemed to desire additional functionality once a message has been reviewed, such as adding a reviewed message to the calendar or pausing a message.
2. Two of the users seemed to grasp onto the device's "Create Message" physical button. The physical label may have varied between design team members, as both "Create Message" and "Quick Message" may have been on the same button for different tasks. Naturally, a consistent interface, both software and hardware, is warranted for proper results.
3. With the device displaying both a picture slideshow and the calendar, two users attempted to set a calendar message via pressing the touch screen in the calendar itself. There may have been possible confusion when the main menu screen was displayed to the user afterwards, rather than "Record Calendar Message" functionality. Since the calendar functionality is currently considered secondary functionality at this time, this may be considered for future versions.

PROJECT CONCLUSIONS

SUGGESTED CHANGES

Our future focus would be to create and view messages as simple as possible. During the three user walkthrough tests, the team noticed four significant changes we would like to update and test in the next iteration of our prototype. We believe these would help the product achieve the core goal of simplicity.

1. *The “Quick Message” button*

While creating a quick message, all users found pressing the “Quick Message” button would start and stop the recording. However, after stopping the recording, users found some confusion in which save button to use, “Save” or “Save To Calendar”. One user recommended that hitting the “Quick Message” button again should save the message as well.

2. *If we display it, it should be quickly accessible*

When asking users to create a message for next week, two users clicked directly on the date they wanted to save the recording for. One user even tried to click on the recording in the “Events” section of the main page. From this, the team would like change the way the main page works using both the calendar and the “Events” as interactive areas.

3. *Add buttons where actions should take place*

In conjunction with the “Quick Message” button change mentioned, we found that users chose to click the physical “Quick Message” button instead of tapping the screen to end the recording session. We also found that while viewing a message, users looked for a pause button. We would like to add buttons to the interface where actions could take place to display possible options to the user.

DESIGN WISH LIST

With our focus on ease-of-use for the product we wanted to make a few changes that might not be feasible to implement for a final product, but we think they would help the end user experience.

1. *Change the physical buttons labels to match context*

Users found the “Quick Message” button easy to use for creating a message, but demonstrated apprehension to use the same button again to stop the recording. If the physical buttons could change labeling text, based on the context with which it is being used, it may help users better understand how to use it.

2. *Add a physical “New Message” indicator light to the device itself*

Even though the device displays a “New Message” notification across the screen, the design team feels having a highly visible *unique* indicator (LED Light?) might draw attention more quickly so users notice new messages are available, especially from long-distances. This message light could be on the top middle section and light up once a new message has been recorded.

3. *Prominently display that the device is recording*

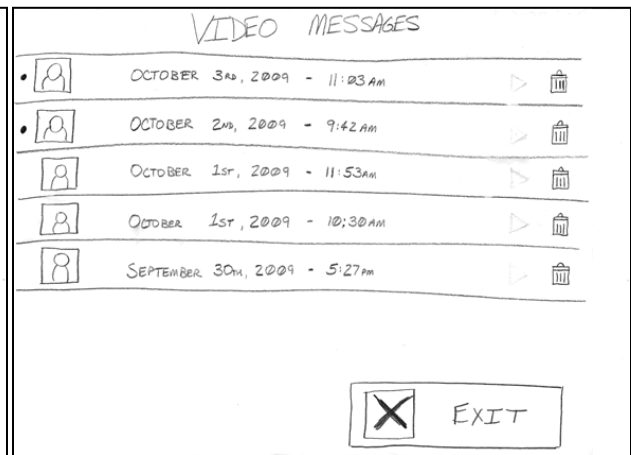
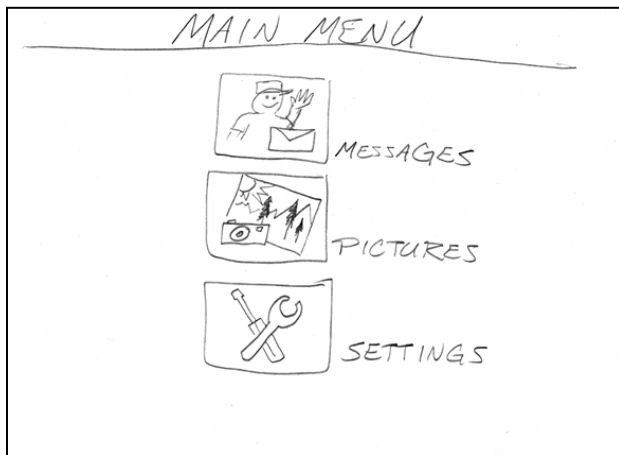
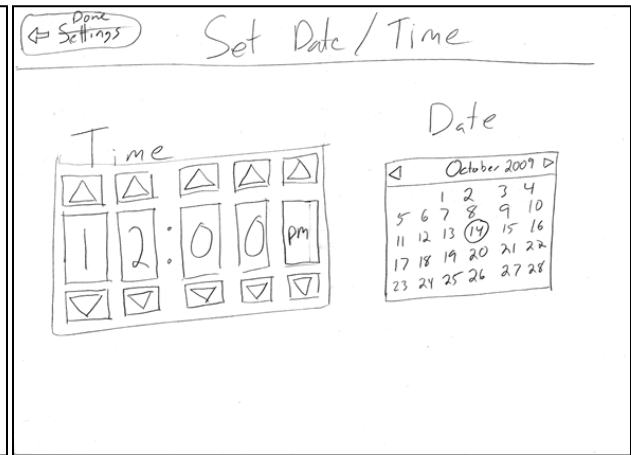
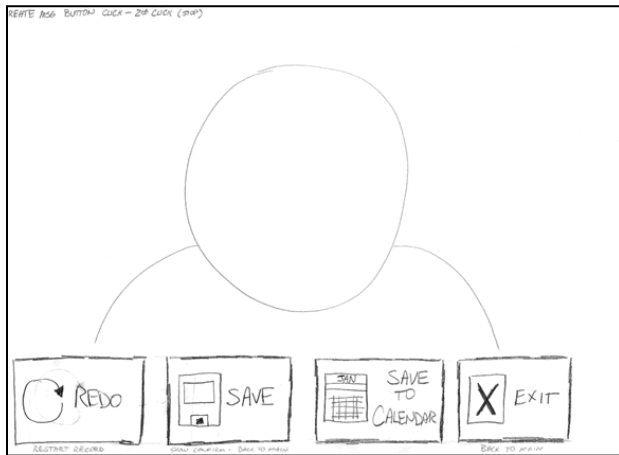
When recording we would like the device to display some indicator that the camera is on as well as recording. Placing a LED next to the camera that turns red while recording could be enough to convey what is happening. It is also possible for this same LED light to turn an alternate color (green) and flash when a new message has been recorded, dove-tailing into the previous wish list entry.

Some of these options are much easier to implement than others, but they all would require hardware changes to the device itself. Since the focal points of our tests were more software related, we felt that hardware changes would take more time to test.

In conjunction with these changes to the device and proposed user interface, the design team believes the next round of walkthrough tests could involve users in a co-discovery setting. This would allow the involvement of different roommates and parent/child combinations, allowing for interaction more in line with the purpose of the device itself. Plus, with the involvement of parent/child combinations, the design team can test the user interface between family generations, allowing for a broader spectrum of ages and technical understanding. Questions such as “How would grandparents interact with grandkids using the device?,” “How would parents interact with their children and their parents?,” and “How would children interact using the device with other similarly-aged siblings?” could be investigated.

APPENDICES

APPENDIX A: INITIAL INTERACTION SKETCHES (PAPER PROTOTYPE)



APPENDIX B: INITIAL PROTOTYPE TASK FLOW DIAGRAMS

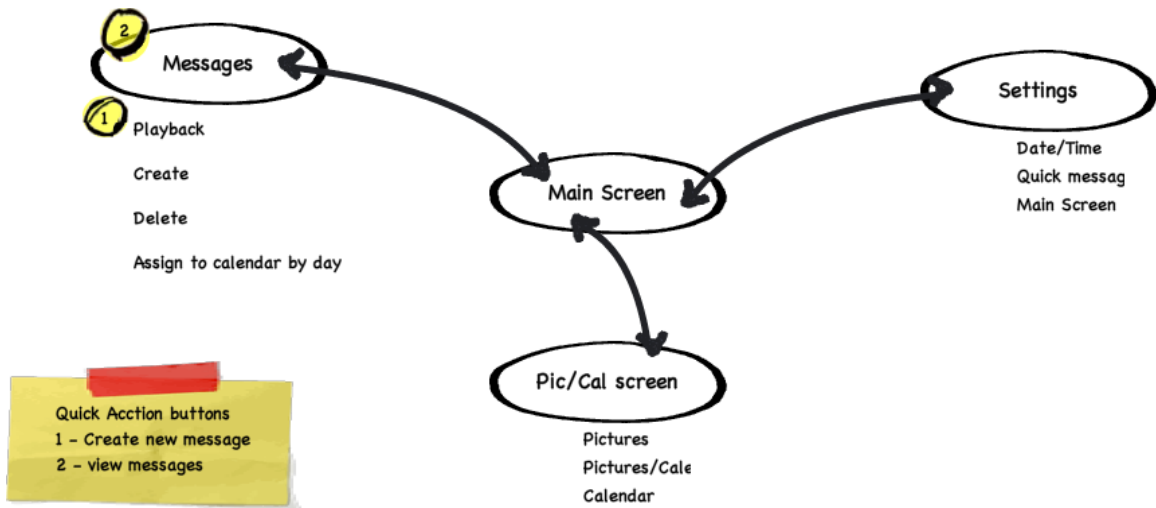


Figure A: Initial Flow Diagram

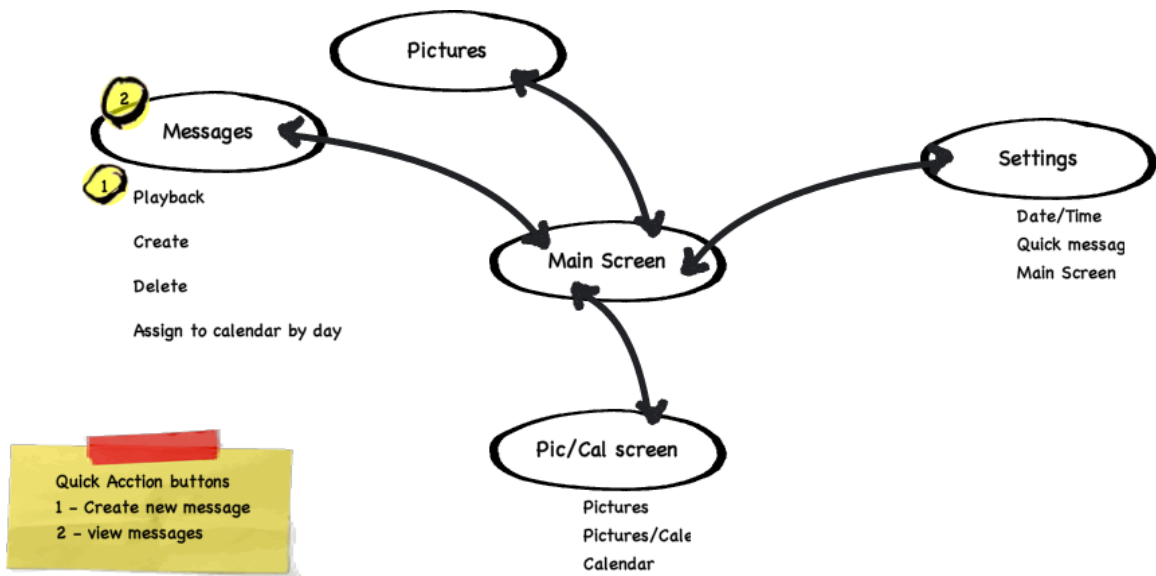
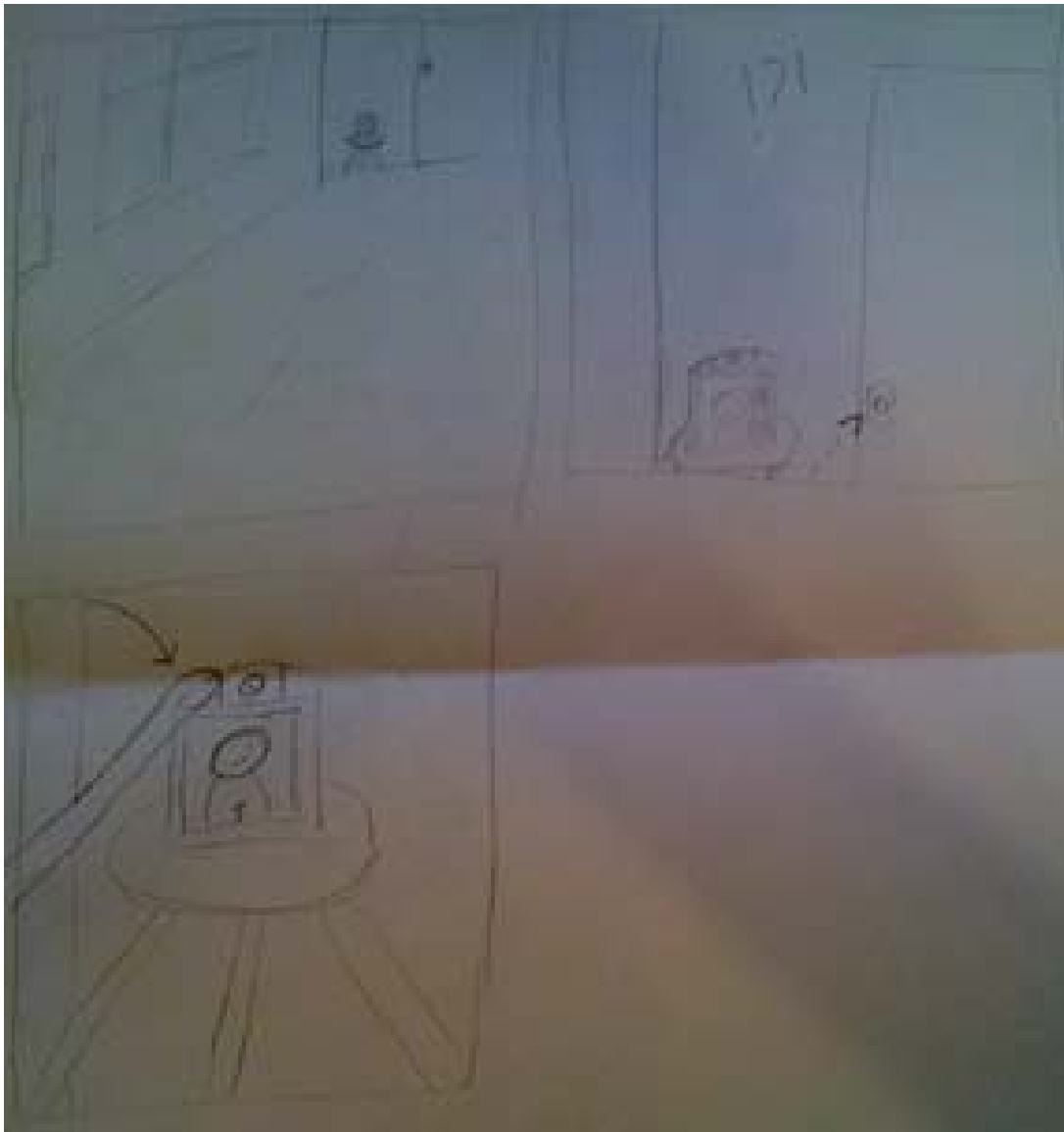


Figure B: Flow Diagram after adding a Pictures menu

APPENDIX C: STORYBOARD DIAGRAMS

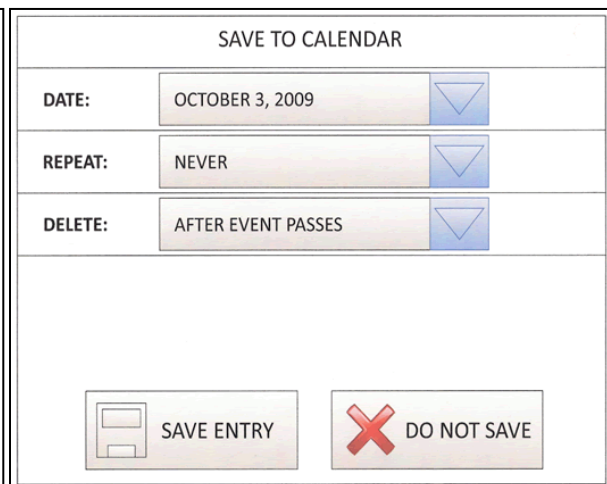
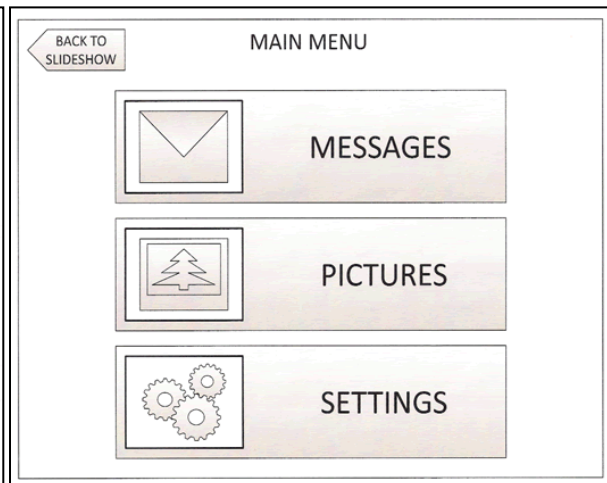
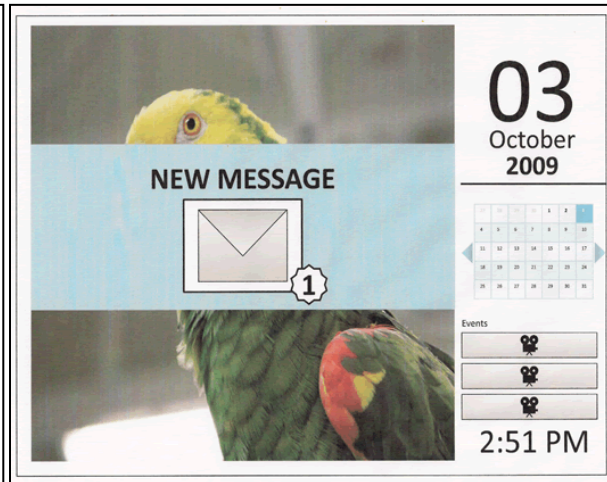
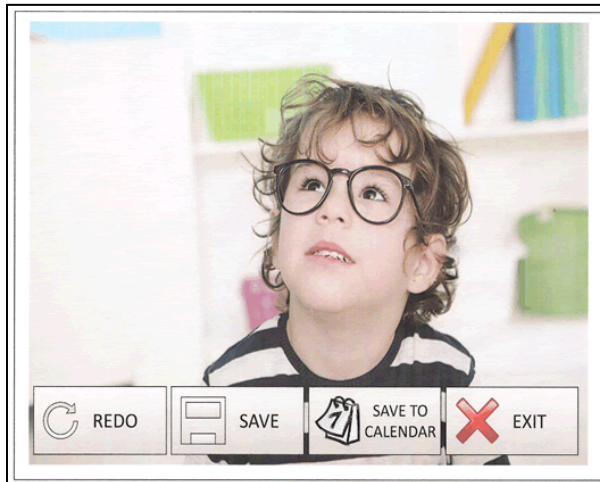


Storyboard #1: User is leaving home. She wants to leave a quick message to tell her mother where she is going. She presses the "Quick message" button and starts recording.

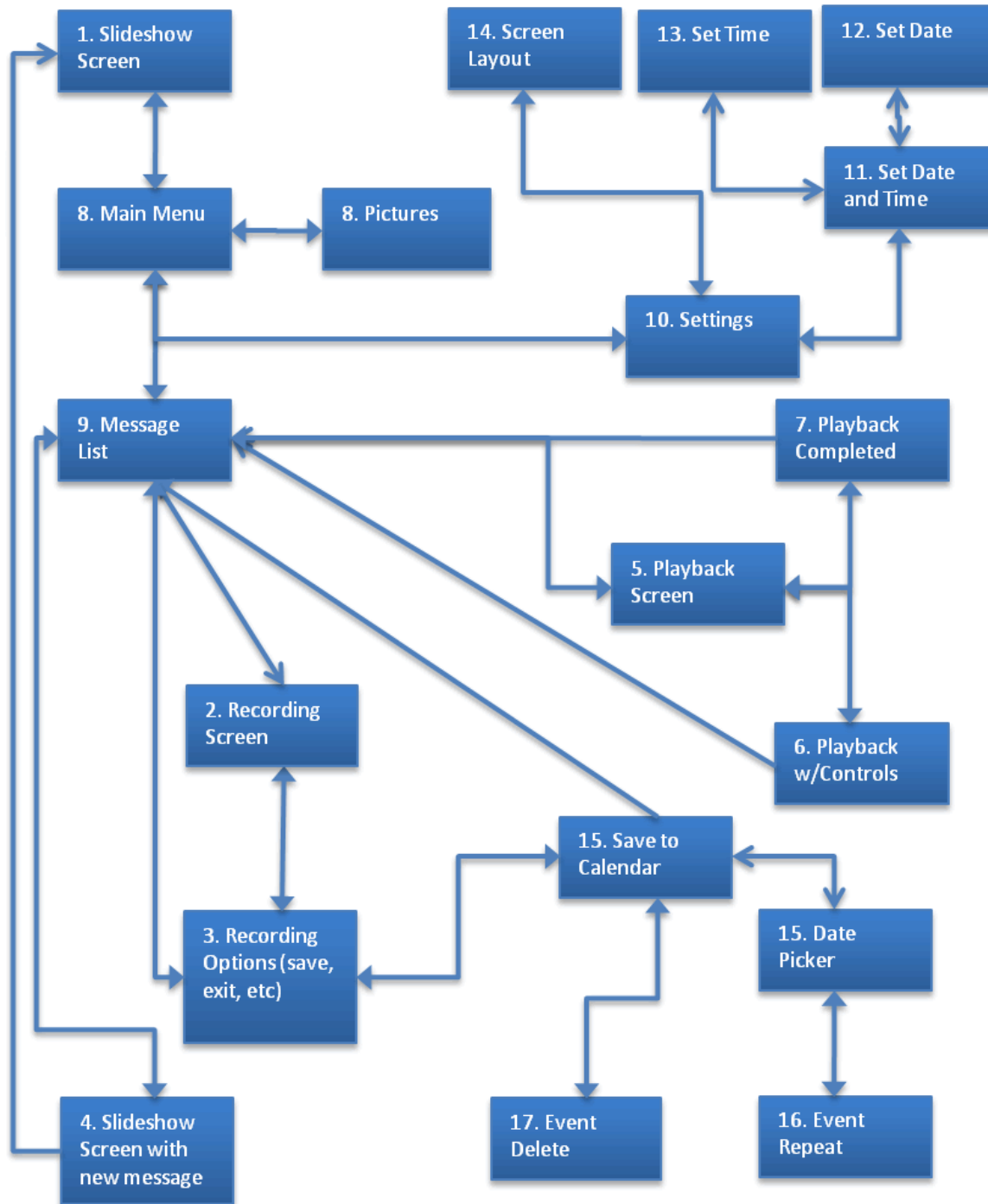


Storyboard #2: User is watching TV on the couch. He sees the new message indicator light, gets up from the couch and walks over to the device. He then presses the “Messages” button to view all the messages, starting with the newest recorded.

APPENDIX D: DIGITIZED INTERACTION SKETCHES



APPENDIX E: REFINED SCREEN FLOW DIAGRAM



APPENDIX F: PRE-WALKTHROUGH SCRIPT

Good Afternoon. We represent product development for a new home messaging system design, development, and usability testing team. Thank you for giving us your time to test our redesigned system. I would like to cover a few points and instructions with you before you begin with our usability test.

1. Your role today is as partner to improve the quality of the home messaging system to our valuable customers. We would like to emphasize that you are NOT being tested, but rather the product you will review is what is being examined.
2. Your input will greatly help us make a better decision as to the design and options to keep, remove, or modify for continued improvements to the web site.
3. You will be given three (3) simple tasks, based on normal functionality within the application. You will have approximately five (5) minutes to complete each task, though we highly doubt you will need this long. In the event you go over the allotted time we will ask you to move on to the next task.
4. Regarding the Tasks:
 - a. We will read to you what we would like you to accomplish in each task. You will also be given a copy (verbatim) of each task. This will allow you time to completely understand what each task is asking you to do.
 - b. Please feel free to ask if anything is unclear. If once you begin and the task still seems unclear, you may ask us whatever is needed.
 - c. During the process of carrying out each task, we encourage you to speak aloud what you are thinking or feeling.
 - i. In other words feel free to verbalize any frustrations, disturbances, ambiguities, unclarity, etc., in anything you see during the process.
 - ii. You may also express any positive or negative comments if you feel it necessary.
 - iii. You don't need to be excessive, but rather very natural in verbally expressing what you, personally, would normally keep in your head.
 - d. Please, do not feel pressured as if you were under a time limitation to complete each task, but rather simply read the task and carry it out as you see fit. There is really no time limit you must beat.
5. After you have completed the tasks, you will be given payment for assisting us and will be free to go.
6. Again, we appreciate your cooperation in the usability testing and will follow-up with a letter of thanks.
7. Are there any questions?
8. Ok, so let's get started with the first task.

APPENDIX G: TASK WALKTHROUGH RAW DATA

Demographics of test subjects (color coded for responses):

- Single Female, appx. 30 yrs. old, living with roommate, no children, technically savvy.
- Married Female, appx. 33 yrs. old, living with husband, no children, not technically savvy.
- Single Male, appx 27 yrs. old, living with a roommate, no children, very technically savvy.

Use Case 1: Primary Functionality	
Task 1.1: Create Video Message	
Goals/Output	Create a message and leave it for the family
Inputs/Assumptions	<ul style="list-style-type: none">• Device is setup and ready to use
Steps	<ol style="list-style-type: none">1. Hit the Create New Message button (or tap the main screen then go to messages then click create new message)2. Speak your message3. Hit the Create New Message button (or touch the screen)4. Hit the save Button
Expert Time	1 minute
User Instructions	Leave a message for your Dad
Notes	

Raw notes from user walkthroughs:

User was successful. User pressed the Create New Message button at top of device, but didn't like the idea of pressing Save to save the message. If message is to be quick (ie, snooze button quick), then the 2nd button press should automatically save the message, but if user presses the touch screen, then the redo/save/savecal/exit selections can be displayed. Perhaps something to think about. If someone pressed the button, left a message, and walked out w/o doing anything else, could there be a 2-3 second "no activity" thing, to stop/save message, and autodelete those seconds w/ no activity? Might be able to create a REAL quick message on the run. "Mom – here's where I'm am – gotta go – see you –DOORSLAM."

User was partially successful. This task proved difficult for the user, and took a good deal of questioning the system and understanding the interface. Test effects are present as the user was more easily able to perform tasks 2 and 3 after struggling with this task in order to learn and understand interface. User talked through process and misunderstood create message button as Send message and talked around why NOT to push it until the message was ready to send. User tapped the screen while noting that there was nothing to do really. User recorded message just fine, and saved successfully.

User was Successful. User had no problem using the "Quick Message" button to start creating the message, but heisted to click the "Quick Message" button to stop the recording. Found it confusing which save button to press to save the message.

Use Case 1: Primary Functionality

Task 1.2: Retrieve Newest Video Message

Goals/Output	View and delete a message so it doesn't take up more space
Inputs/Assumptions	<ul style="list-style-type: none">• Light on device is blinking to indicate new message• Screen itself is displaying "New Message" indicator over picture slideshow
Primary Steps	<ol style="list-style-type: none">1. Click view messages button2. Click on the message to view3. View the message.4. Click Delete message5. Confirm message deletion
Expert Time	1 minute
User Instructions	View a message to you and remove after viewing
Notes	

Raw notes from user walkthroughs:

User was successful. She suggested possibly having a "savecal" button on the end message screen (Screen 7), in case a message should be saved to a calendar date in the future.

User was successful. User quickly tapped screen and navigated to the message list to view the message. She questioned if it would play automatically or if she would have to press play or some other button. User easily deleted message.

User was successful. Didn't quite know how to pause the message being viewed, thought a button might help.

Use Case 2: Secondary Functionality

Task 2.1: Create Future Video Calendar Entry

Goals/Output Remind your son to do his chores after school next week

Inputs/Assumptions

Primary Steps

1. Hit the Create New Message button (or tap the main screen then go to messages then click create new message)
2. Speak your message
3. Hit the Create New Message button (or touch the screen)
4. Click save to calendar
5. Set Date for next week
6. Set repeat to never
7. Set Delete to after event passes
8. Click save entry

Expert Time 1 minute

User Instructions Make a message to your son for next week

Notes

Raw notes from user walkthroughs:

User was successful. Test might have been better if we would have the day selected in acetate (overhead), so that date can be moved if/when needed. User seemed fairly confident in doing this task.

User was partially successful. **Prototype issue: User wanted to complete this task by clicking on the calendar.

Our prototype really allows for the calendar to be accessed only after recording a message. She wanted to do it the other way. User was prompted to think about how to record a message. This resulted in immediate understanding and easy navigation to how to record and save to calendar. Worked the calendar save screens very well. Noted that she wanted the message to delete the day after it was viewed, but when faced with the choices to delete after event or when space is needed, she talked herself out of after event because it seemed to mean immediately after the event occurred and that did not seem appropriate. (Interesting, but maybe a semantic issue for a button label).

User was successful. User tried to click on the date using the calendar to record a message to. Once he figured out that click the calendar just took him to the main menu he was able to move forward. When recording the message he didn't know to just tap the screen to stop the recording, instead he pressed the "Quick Message" button. He thought that was confusing.