Pen Pal

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Our project, Pen Pal, is an application that will help children from around the world interact with each other easily. Through this app, we hope that students from different environments can learn from each other and create an awareness of other cultures. Although our primary stakeholders are the children, we have also included teachers as secondary stakeholders to provide a layer of security, and to facilitate the learning of other cultures. Teachers from each school can register their students into the system. Once registered, students can ask the system to match them with another student in the system from a different school with a different cultural background. If a student wants to begin communicating with his new pen pal, he can easily send a message through different media such as text, voice, or drawing through a kid-friendly interface. He will also be able to receive a response from his pen pal. The teacher can encourage the students to make pen pal friends without the overhead of contacting teachers from other schools. The students can make new pen pal friends, and they can establish strong connections with children from around the world to learn about their cultures, and to encourage cultural awareness. Pen Pal will teach the students about the backgrounds of their pen pals, about the differences of their lives, and about the many interesting facts that they would not be able to learn in class.

BRAINSTORMING PROCESS

We first decided to brainstorm ideas for all the possible target groups. By jumping off of the idea of allowing kids to communicate in foreign languages, we thought about the metaphor of allowing kids to find and talk to pen pals. After narrowing the ideas down to Marco Polo (an app to help elders relocate their belongings), Pen Pal (the app to help kids communicate with each other), and Photo Translate (an app to translate pictures into words for recent immigrants), we decided that Pen Pal would have the most potential.

Pen Pal would allow kids to interact with each other in a way that would be more intuitive than the standard text message system. We targeted kids from the age of 6 to 12, as they would be old enough to read and understand the interface, yet young enough to appreciate the idea of a pen pal. In addition, we felt that it would be best to expand the minds of kids through experiencing other cultures. Because kids across the world would have easier access to mobile phones than to computers, we believed that mobile would be a good platform for this app. Using a mobile app would also allow the kids to quickly access the app to read or send messages wherever or whenever they feel the need to talk to a pen pal.

SKETCHES & IDEATION

After deciding on Pen Pal, we decided to expand on the details of how the app would function. We decided to focus on fixing the security of the application, deciding on how a friends list feature would work, and allowing the students to interact with each other through different forms of communication: texting, drawing, and speaking.

First, we focused on the security problem of anyone being able to talk with the kids. It would have been hard for us to distinguish between a parent of the child and an imposter. Therefore, we decided to allow teachers to register with the app by verifying their credentials, and allow them to register their students into the system. With this method, it is now possible to clearly distinguish between a certified teacher and a predator. In addition, it would assist in our goal of teaching the students about different cultures, as teachers would be able to incorporate this app as a part of their educational curriculum.

Next, we discussed how a student would be able to continue a connection with a previous pen pal. Without a friend list, the user would have only been able to reply to an old pen pal by manually locating a previous message from that pen pal. In the end, we decided that a friend list would be necessary for the student to easily start a new conversation with people with whom they had previously talked. In addition, the students can converse not only with their friends, but also with new pen pals who they could later add as a friend.

Finally, we decided to provide students with various forms of communication to encourage creativity and to allow students to transmit their ideas more easily. Students can choose to create a standard text message, draw a picture, or send a voice message to their pen pals. By providing these options, students who do not share the same fluent language can still attempt to communicate through other means. The flexibility of communication would allow for a more unique interaction between pen pals of all languages.
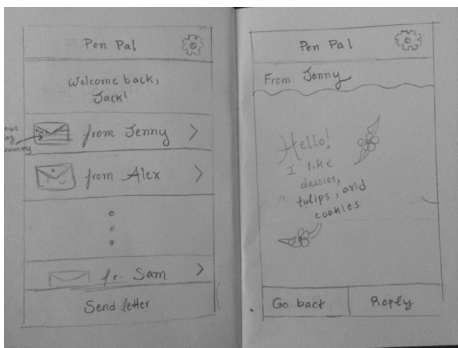
On left: Welcome screen, each child's new message is displayed on the welcome screen. The button at the bottom says "Send letter"; On right: The child receives a message with drawing and text.
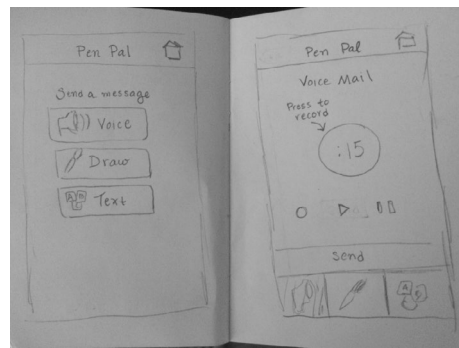
On left: the child has three options for responding to a letter. He can send a voice message, drawn message, or text message; On right: the voicemai recording screen.The kid can press the countdown button to start recording.
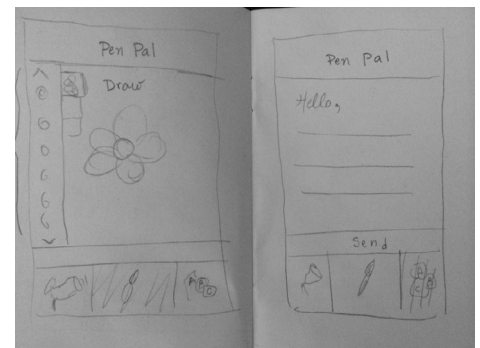
On left: the art sending message screen, the kid can either use stickers or a paintbrush to create a scene; On right: a child can send a text message to his pen pal through a keyboard.
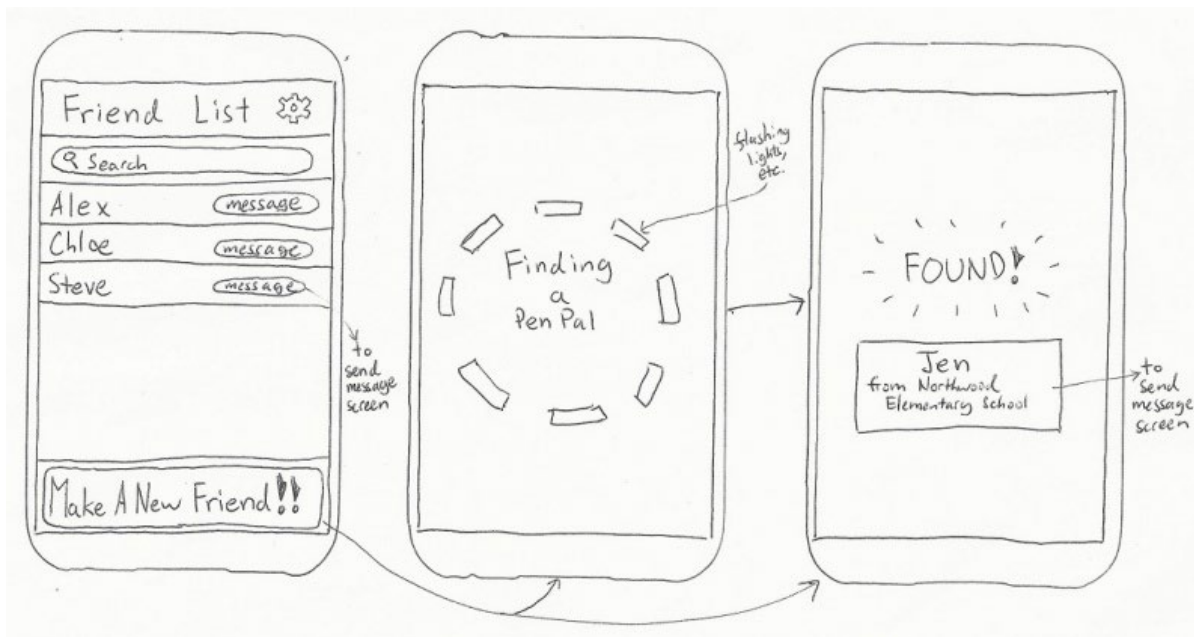
This sketch shows the initial idea for the friends page. The child would be able to message a previous friend. He can also find a new random pen pal through these screens.

COMPETITIVE ANALYSIS

When we looked at the market, we realized one big thing about the other pen pals apps: they focused on dating or adults, and they did not cater to kids. Apps such as ezTalky require the user at least 20 years old to use, and others such as Hi! Penpal! and PenPals have confusing or complex interfaces. These clearly do not translate well to a younger audience with limited technology backgrounds. In addition to the confusing interface, these competitors usually withhold paid features or limit the amount of messages a user can send in order to make money. All of the above are detrimental to the user experience when it comes to children.

The biggest threat for us is the established market of apps - people who have already developed friends and pen pals would unlikely to move, even if the new product offered a compellingly better service.

We think that we can combat this resistance by attempting to collaborate our launch with teachers, and have our application be one of the first that children use on mobile devices. In this way, we can tap into a new generation of potential users and at the same time custom tailor our application for this consumer segment.

To better position ourselves in the market for kid friendly applications, we want to avoid what the market is currently doing and keep things simple. This means keeping the number of different screens to a minimum and build sound effects and child friendly interactions. In addition, we will tailor our feature set to serve kids rather than just the standard set that other applications have. In this way, we can provide ways to communicate beyond text, such as drawings and voice recordings. These new communication mediums serve two purposes: an

outlet for a child's creativity and a way to bridge communication barriers that are present when two pen pals speak different languages. This brings us to the biggest differentiator of our product.

We feel that in order to stand out among the existing solutions, we need to have a compelling selling point. This is where our mission comes in. We want to extend the cultural awareness of children from the ages of 6 to 12. By tailoring our application for this segment and integrating the mobile app with a web application that allows teachers to track the kids' communications, we think that our app could be a very useful tool in the social studies or history classrooms. In today's world especially, kids need to have a way to immerse themselves in other cultures and the lifestyles of people from other countries in a truly interactive way, and the goal of our app is to provide this functionality.

WIREFRAMES

CREATED USING BALSAMIQ

FINDING A FRIEND
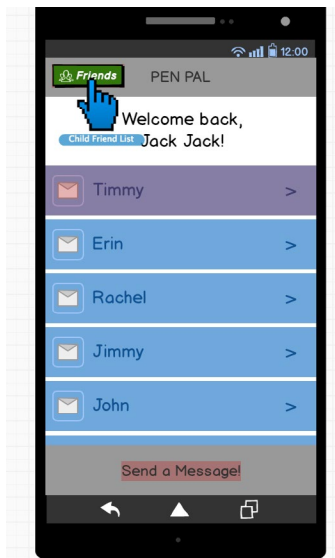
Welcome Screen - displays all of Jack Jack's messages. Also allows for sending a message.
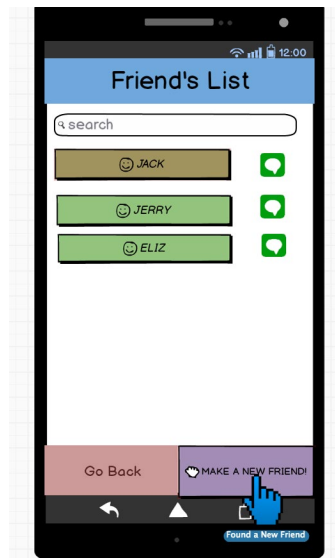
Friends List - Student can make a new friend or contact his old friends through this screen.

New Pen Pal Found! After a new pen pal is found, they can send each other a message.

SENDING A MESSAGE
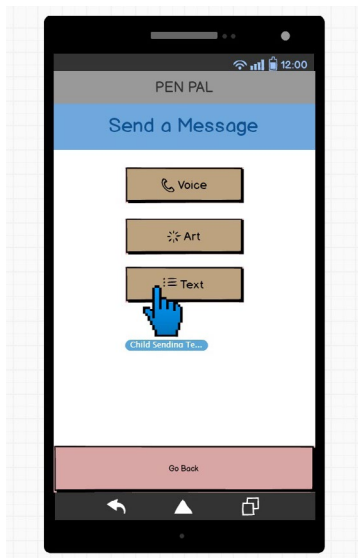
Send a Message screen, the user can pick between voice, art and text.
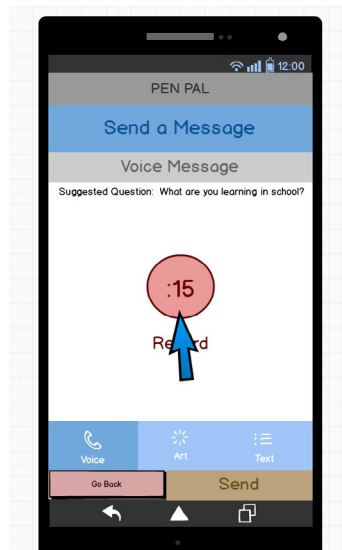
Record a message; the user can record a 15 second long voice message.

The user can also send a text message to his pen pal.

RECEIVING A MESSAGE

The user can access all his message through the home screen.

Timmy has sent Jack Jack voice recording, Timmy can play the recording by pressing play.

PERSONAS

JACK JACK is a 7-year-old boy from Minnesota, US. He likes to talk to people, and make many new friends. He has experience using phones, and he knows how to use mail. His teacher assigned the app to him a year ago, and he has been using it since. He has made several close friends through the app, including Junior Anthony.
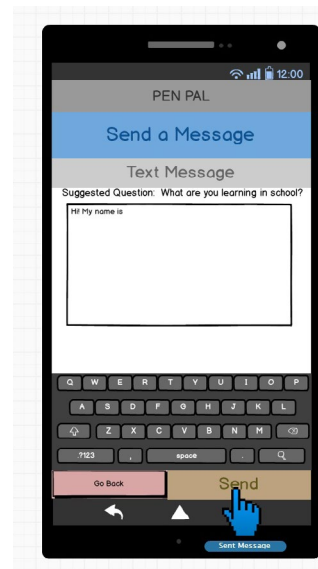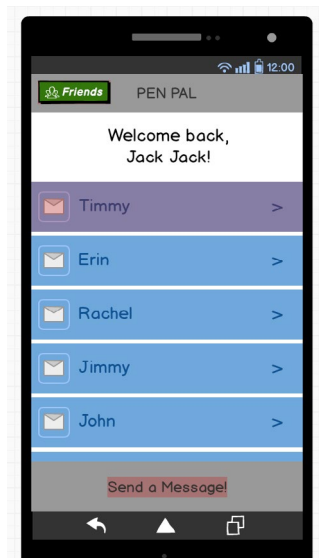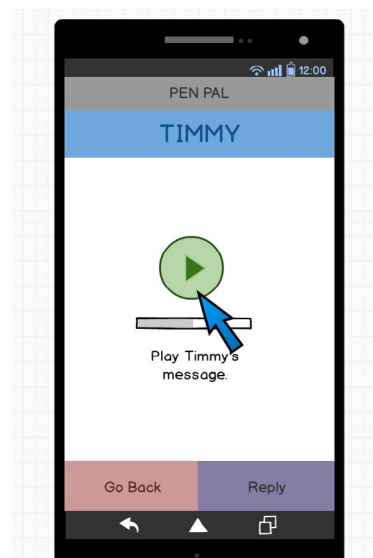
TIMMY is a 9-year-old boy, from Barcelona, Spain. He is shy and prefers to have closer connections, but he loves to show his drawings to others. He does not know how to use mail, but he does know how to use a phone. Although he speaks some English, his native language is Spanish. He enjoys using the app to send his drawings to his pen pals.

ANGUS is a 10-year-old from Los Angeles, US. He speaks English and some Korean, but has little knowledge about his heritage. He currently plays video games by himself, but would love to play them with others. By using the app, he hopes to find someone else with whom to play games. His parents encourage him to use the app to talk with friends.

JUNIOR ANTHONY is a 6-year-old from New York, US. He speaks English. When his teacher first assigned the class to find a pen pal, he did not want to do the assignment. However, after meeting Jack Jack, he finds himself using the app daily. He always looks forward to a new message from Jack Jack each day.

ANNIE is an 8-year-old girl from France. Her teacher assigned her a project to find a pen pal. She is fluent in French, but is also very good at English. She is apprehensive about using the app and hopes that her first pen pal will be a nice person.

MRS. EVANS is a Jack Jack's teacher who assigned him the app a year ago. She is impressed with Jack Jack's progress with the app, and is using the app with her current students. She knows that some students do not always enjoy using the app, but encourages them to try it at least once.

NATHALIE is a 12-year-old girl from Mozambique. She knows some English, but wants to become more fluent while making new friends through this app. She hopes that the people she meets through the app can teach her more about life in other countries.

SCENARIOS

When thinking about the types of actions a user would want to take with Pen Pal, we came up with three representative tasks. A user would want to find a new pen pal if it is his first time using the app, he would want to send a message to a friend that he had previously messaged, and he would want to listen to an unread message from a new Pen Pal.

For the first scenario, a teacher registers the student into the system and asks the student to make a new pen pal. Without this app, this task would be very difficult for both the teacher and the student. With this app, the student can navigate to the friends list screen and find a new pen pal. After the student has found the new pen pal, he can decide to search for a different pen pal, or he can initiate a conversation by sending a message. Although finding a pen pal is an essential part of the app, we placed it one screen away from the home screen because users would not use this feature as frequently as receiving and sending messages.

This scenario documents the first task that the user will have to perform upon obtaining the app. They will have to go from the home screen, which will be empty if it is their first time using it, to the friends list, where they will be able to find their potential first friend. They will also be able to look for a different friend if they wish to, or they can immediately send a message to their new pen pal.

For the second scenario, the student would have already made a pen pal, and is at home. Upon hearing a notification of a new message, he can open the app, press on the new, unread message, and view it. Because the message is a voice message, a play button allows him to listen to the message. After he is done, he can replay the message, reply to that message, or go back to the main screen.

In this scenario, the user performs a critical and very straightforward action in our application: opening an unread message and responding to it. Our application opens to the "inbox" of the user, so this task should necessitate only one click on the name of the user to read the incoming message. We made the design of this initial screen such that it is very easy for the user to do so. Since users will read a message very often, it is critical that it is as frictionless as possible.

The final scenario is when the student has free time during recess, and would like to talk to send a message to one of his closer pen pals. He can choose to find a previous message to continue an old conversation, or he can navigate to the friends list and find the pen pal there. Because he does not feel like looking through all of his received messages, he goes to the friends list, finds his friend, looks at his friend's profile, and presses the send message button. Once he has chosen to message the friend, he chooses the picture message option, draws a picture, and sends the message. After the student sees the message sent confirmation, he closes the app and goes back to playing at recess.

In this scenario, the user performs a very common task. While this may seem similar to the easy task of simply replying, it is much more involved as the user must navigate through a few selection menus in order to reach the messaging portion of the application again.

The app opens into an inbox, so the user must first click on the friends list button to take them to their list of friends. Here the user chooses a friend to send a message to and a type of message that they wish to send. Once they have constructed their message, all they have to do is press the send button and their message is on the way.

USER STUDIES

In order to gain more insight into a child's mind, we interviewed three children to give us feedback on our first prototype. First, we asked them general questions about their experiences with mobile devices and their feelings about making friends from other countries. This was to get more information on what kind of expectations the kids might have for our application. Then, we presented them with an interactive prototype of our application and walked them through the three tasks described in the previous sections. The goal of this activity was to pinpoint any problems or confusing aspects in our app by allowing a real user to use it. From these studies, we were able to identify and fix several issues with the initial design of our application.

The first participant was a shy boy in 3rd grade. He understood the concept of writing letters, but was ambiguous about whether he knew how to use a phone and whether he understood the concept of cultures. The majority of the time, he would remain silent for a few seconds before he spoke, which showed us that some feature was ambiguous.

When we asked him to open a message that he received, he was able to quickly click on a message in his inbox and listen to it by clicking on the play button. He did look a little confused, but was able to find the reply button and send out a reply to the message. When we asked him to start a conversation with one of the friends on his friends list, he instead went back to one of his received messages and replied from there. Even after encouraging him to look elsewhere to send a message, he was unable to send a message another way. Afterwards, he did not wish to add his pen pal as a friend, and did not give a reason why. When we asked him to try to find a new friend, he had a lot of trouble performing the task. First, he tried replying to the same message again, and when he navigated to the friends list, he tried to send a message to one of his current friends. He finally decided to press the "find a new friend" button when we explicitly pointed it out to him. He decided to send a text message to the new pen pal that the app found for him.

We decided to make several changes based on the problems that this user encountered. One of the biggest problems that this user had was not noticing the important parts of our application. First, he had trouble finding the friends list button to send a message to one of his current friends. In the mockup we used to test with him, the button was located in the upper left corner of the application. To fix this, we put it at the bottom of the app, made it much he larger, and changed its color brighter and more noticeable. Similarly, he had a lot of trouble locating the find a new friend button, so we also decided to make it larger and more colorful. These changes now make it easier for users to notice the more important functionality of the app.

The second participant was also a boy in the 3rd grade. Because he owned an iPad, he seemed very familiar with the layout and the visual cues associated with buttons on smartphones. He was very talkative, and was excited about the idea of meeting new friends from different countries. When we asked him about how he would contact his friends, he replied that he used Siri on his mom's phone to call his friends. The other ways he contacted his friends were in person at school and in online games such Minecraft and Runescape. He spent a lot of his time playing single-person games on his iPad as well.

He was easily able to listen to his first message from a pen pal. However, when he went to listen to another one he was confused because there was no indication of which messages he had already opened. After he replied to the message, the app asked him if he wanted to add the recipient as a as a friend, and he asked, "Isn't Timmy my friend already?". When he navigated to the friends list page, he was confused because he did not know whether to click on the user name or the message icon. He tried both and found that clicking on the user name took him to a profile page, while the message icon took him to the send message screen. He suggested that there should have been only one button per friend on the friends list page, and the send message button should have been on the profile page instead. When he wanted to find a new friend, he remembered that the "find a new friend" button was on the friends list page and easily navigated there to click on it. When he found his new pen pal, he asked why there was no picture of that pen pal. He also asked why he could not look for a different pen pal, as he wanted a girl pen pal instead.

Based on our observations with this user, we decided to change the friends list so that each friend would only have one button. By following the user's advice, we decided that it would be better for each friend's button to take them to a profile page, where they can view the information on their friend and decide to send a message from there. We also changed the definition of a friend to be anyone that the user sent a message to. That way, the interface would not confuse the user, and the app would promote a friendly environment. For the picture of the new pen pal, we decided that including pictures could be a security risk for the students. Instead, we added "stamps" which the kids could personalize. The user sees these stamps next to the names of their pen pals throughout the app. These stamps allow users to inject a portion of their own identity into the app so that users can easily recognize their pen pals without breaking the safety of our application.ity of the app.

The last participant was a 3rd grade elementary girl who had a friendly attitude and provided great feedback in designing our application. She had experience using her parents' smartphone and understood how to navigate through applications. Given that she just completed her history class and wanted to learn about cultures of other countries, she was a great potential user for our application. She was very outgoing and loved the idea of meeting children from other countries, and she preferred making new friends to talking to old friends. During our conversation, she was able to express many of her ideas clearly and provide suggestions on how to make our application design child-friendly.

Because of her previous experience using smartphones, she was able to navigate through the screens of each individual task easily. When she was on the initial home screen, she understood the idea of clicking on the person's name to start a new message or reply to a person's message. However, she suggested eliminating the "send a message" button in place of directly allowing the user to message the person by clicking on his or her name; the "send a message" button was ambiguous, since it was not clear to whom the user would send the message. On the reply message screen, she pointed

out that she wanted to be able to send a single message containing the voice, drawing, and text portions in a single task, without clicking on the receiver's name multiple times to send message for these different options. When sending a message, she smoothly navigated through the drawing and text message, and provided good feedback on the voice message view. She was not sure how to start the recording process, as the record button did not look pressable because of its flat design. Overall, the girl was able to understand and navigate through most parts of the application easily, and she provided great feedback on parts of the design that might have been confusing to children.

After our conversation with the girl, we made many changes based on our observations. After many discussions and much user testing, we decided that the "send a message" button was ambiguous, so we removed the button and focused on designing buttons with the receiver's name on it. Children will be able to click on a person's name to send a new message or to reply to a message. This change makes it much clearer to whom the users will be sending the message. Upon receiving a new message, the button also indicates if the user has already read the message.

On the sending message page,

we decided not to allow the user to send multiple types of messages at once because it would be more confusing for the recipient. To make it easier to send different types of messages to the same person, we made it so that instead of returning to the home screen after sending a message, the user will be able to choose to send another message to the same receiver right away. Such design allows the user to send multiple messages under one task (for example, after sending a text message, the user can send a drawing message without leaving the send message page), but at the same time avoids packing multiple messages into a single message.

Another thing we have focused on is to redesign the voice record page to make the design simple and clear, previously a flat design button icon does not clearly represent a button, and user might not be able to understand how to start the recording process. However, after redesigning the button with a 3D look, it is clear to the user that clicking on the button will start the recording process. Overall, we have made many changes, and all of these are critical changes that will directly affect the usability, workflow, that allow users to navigate through pages without getting confused.
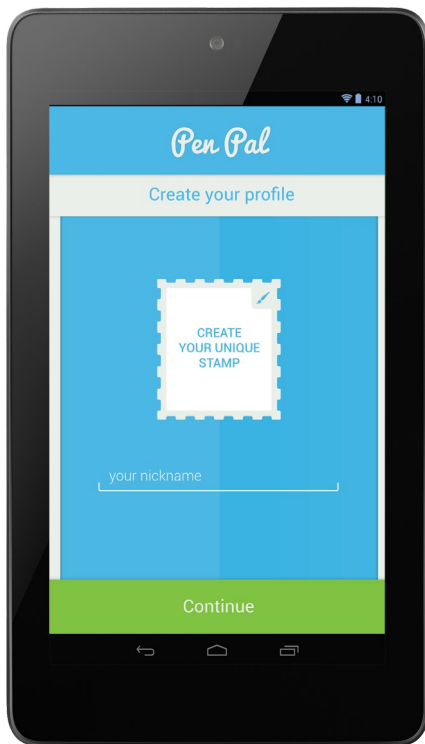
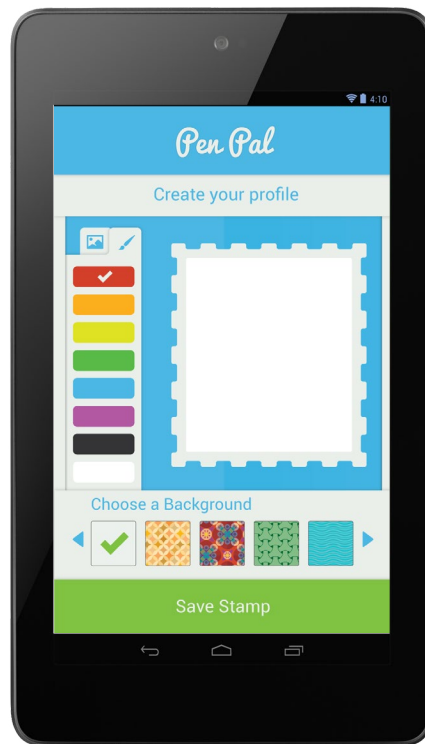# FINAL DESIGNS
CREATED USING ILLUSTRATOR

Pen Pal
USERFLOW

① LOGIN PAGE
The background of the app imitates a folded piece of paper.

② FIRST LOGIN
The user is taken to this screen after their first login.

③ DESIGN A STAMP
The user starts off with a blank canvas.

④ DESIGN A STAMP
The user selected a new background.

⑤ DESIGN A STAMP
The user selects sticker images to place on his/her personal stamp.

⑥ STAMP SAVED
After creating a stamp, the user inputs his/her nickname to continue.

⑦ ACCOUNT CREATED
After creating an account, the user gets to meet his first pen pal.

⑧ WELCOME SCREEN
Upon login, the user is greeted with his new pen pal messages.

⑨ YOUR FRIENDS
Displays a stamp for each friend a user has.

⑩ LOADING PEN PAL
Loading screen that is displayed when finding a Pen Pal.

⑪ FOUND PEN PAL
Loading screen that is displayed when finding a Pen Pal.

⑬ RECORD VOICE
Throw me a question guides the child in what to talk about.

⑭ RECORD VOICE
The child now has access to a question to answer.

⑮ RECORD VOICE
The child is timed on how long he gets to speak.

㉓ MESSAGE HISTORY
A user can view the history of his messages with another Pen Pal

㉔ PEN PAL DETAILS
Each Pen Pal also has his own stats page accessible by all his friends.

⑫ SEND A MESSAGE
The user can choose to send a voice, text, or drawn message.

⑱ DRAW A MESSAGE
The user can draw a picture to send to his pen pal.

⑰ DRAW A MESSAGE
The user can draw a picture to send to his pen pal.

⑯ RECORD VOICE
The user can replay his message or send it

㉕ RECEIVING A MESSAGE
The user clicks on the mail to access the message.

㉖ RECEIVING A MESSAGE
The letter animates and flips.

㉒ MESSAGE SENT
The user can undo his message or send another.

⑲ TEXT A MESSAGE
The user can also send a text message to his pen pal.

⑳ TEXT A MESSAGE
If the user is stuck, he can get help with generating a random question.

㉑ TEXT A MESSAGE
The user types a message

㉗ RECEIVING VOICE
The user receives a voie message from his pen pal.

㉘ PLAYING VOICE
The user clicks on the play button.

㉕ PLAYING VOICE
The user can pause the voice recording

㉚ REPLAY A MESSAGE
The user has the option to replay the message or reply.

㉛ RECEIVING TEXT
The user receives a text message.

㉜ RECEIVING ART
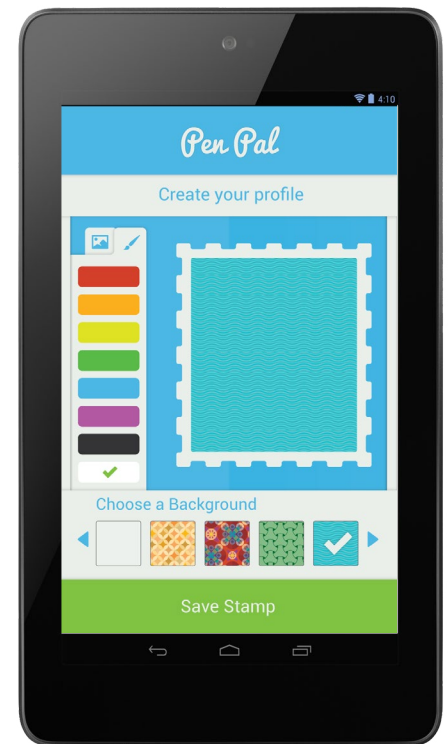The user receives artwork.
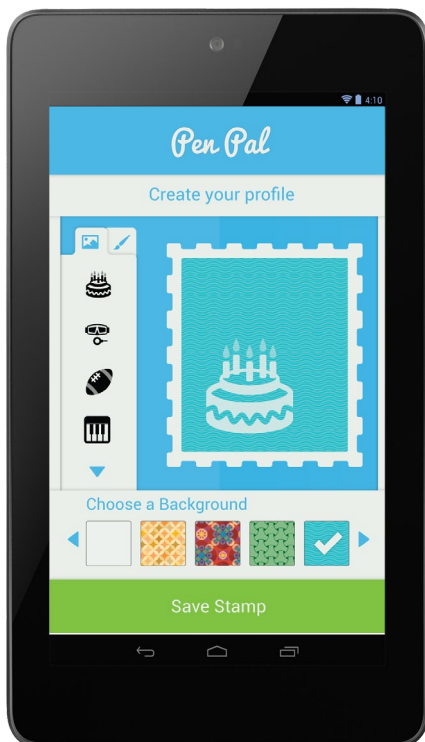
CREATING AN ACCOUNT

After the user's first login, he is able to create a unique stamp. To create a stamp, he clicks on the stamp icon
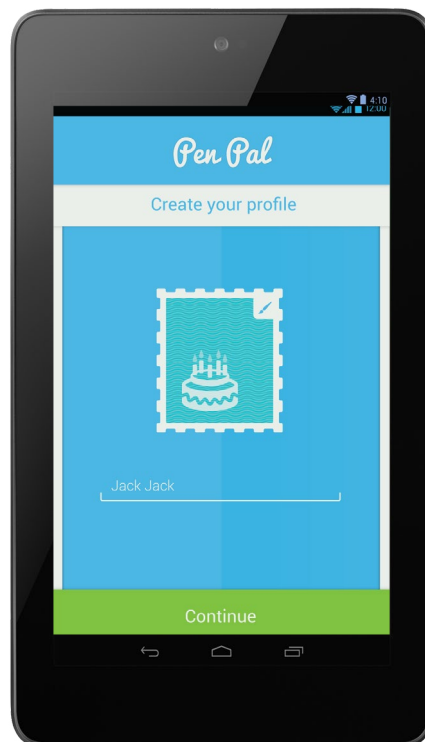

This is the stamp interface. The user can choose a custom background, draw a sketch, or insert a picture.
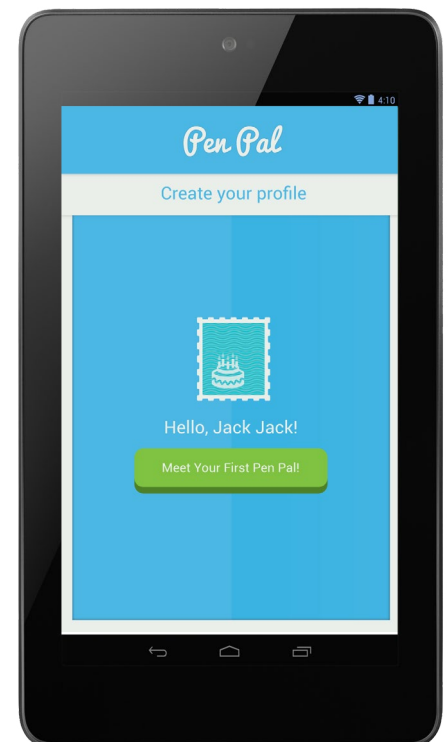

The user has chosen a new background for their custom stamp.

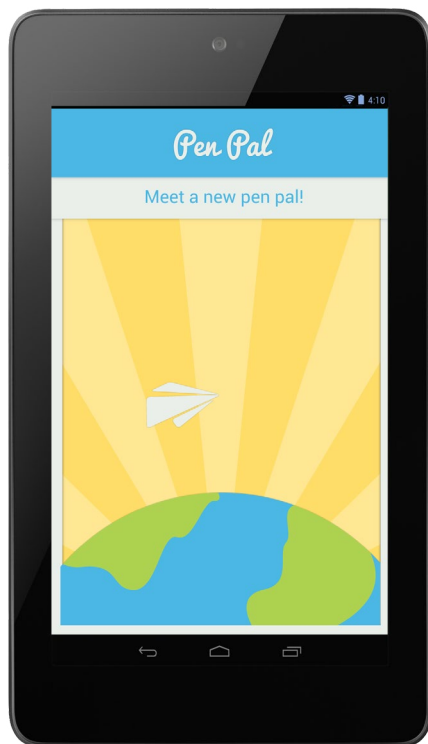The user has added a sticker to his stamp creation.

After saving a stamp, the user can then input his nickname in the name field.

After creating his account, the user is prompted to create his first pen pal conneciton.

MEET A PEN PAL

After clicking "Meet a New Pen Pal", the user is taken to a loading screen that demonstrates how far his pen pal lives from him.

After being paired with a pen pal, the user is allowed to search again or message his new pen pal.

VIEW FRIEND MESSAGE HISTORY
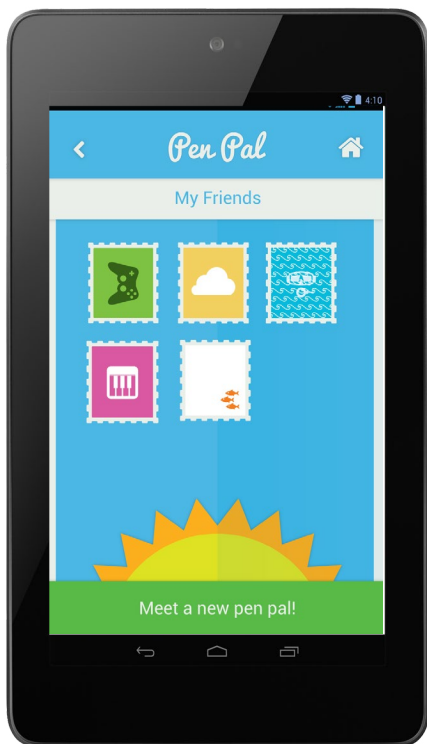
The new "Friends" page only shows stamps be-cause stamps are easier to identify as compared to foreign names.
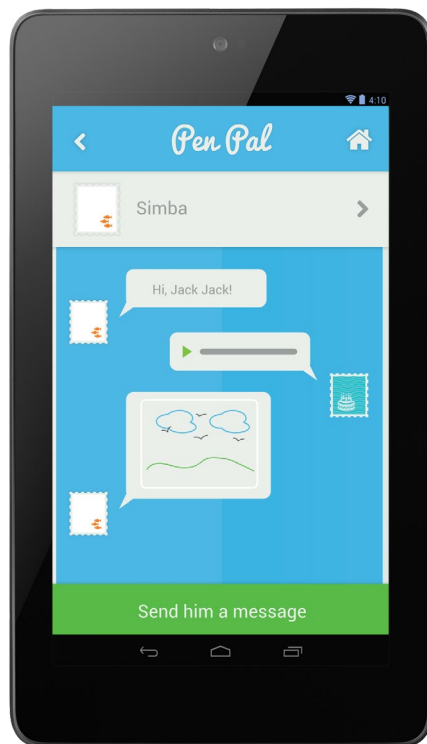
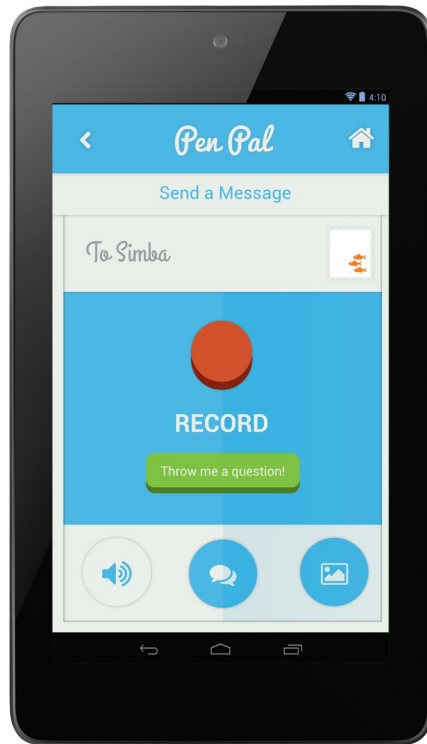After clicking on a stamp, the user is taken to a message history.
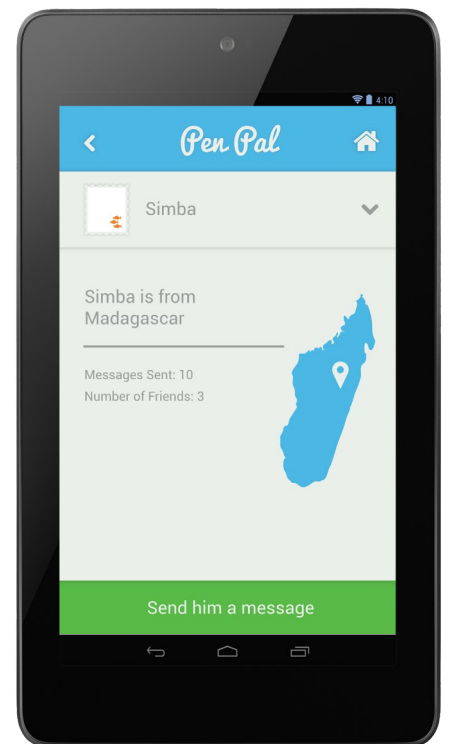
He can also click on a user's name to access more information about his pen pal.

SENDING A VOICE MESSAGE
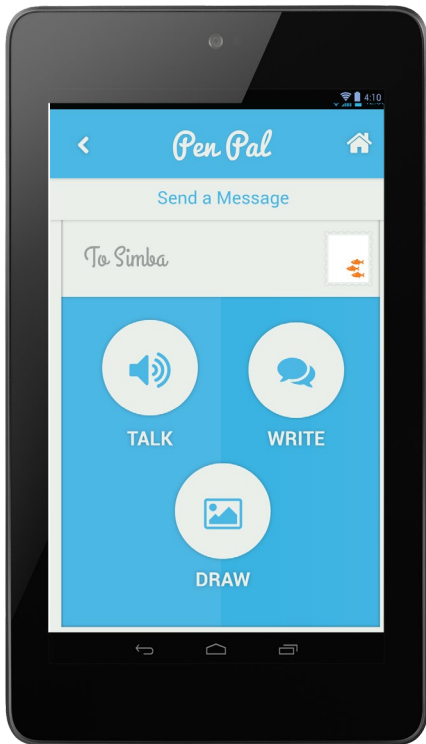
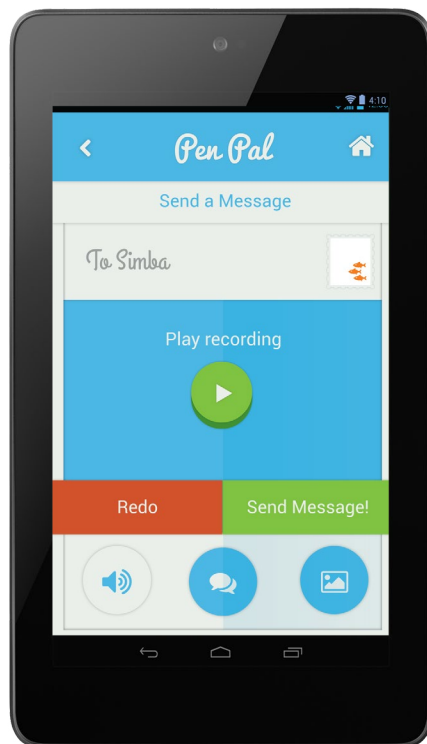The user is able to choose to send a voice, drawing, or text message.

The buttons as compared to previous iterations are more prominent.
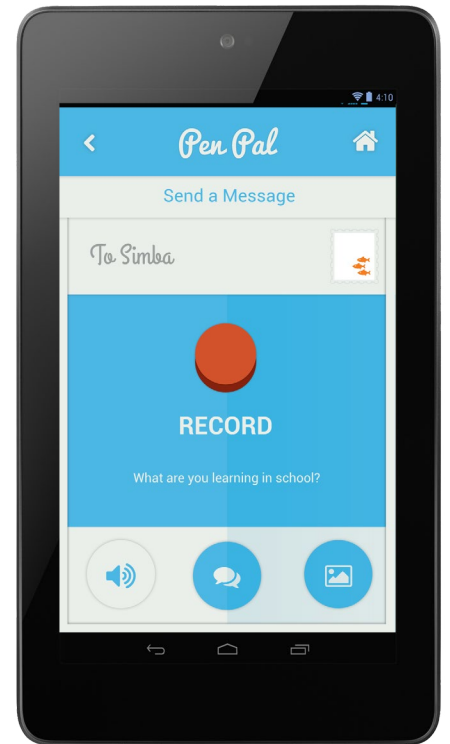
The user can get a random question generated to guide him in talking to his pen pal.
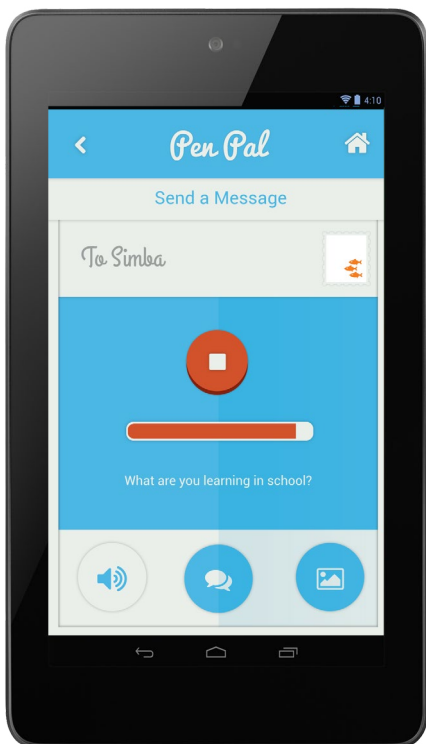
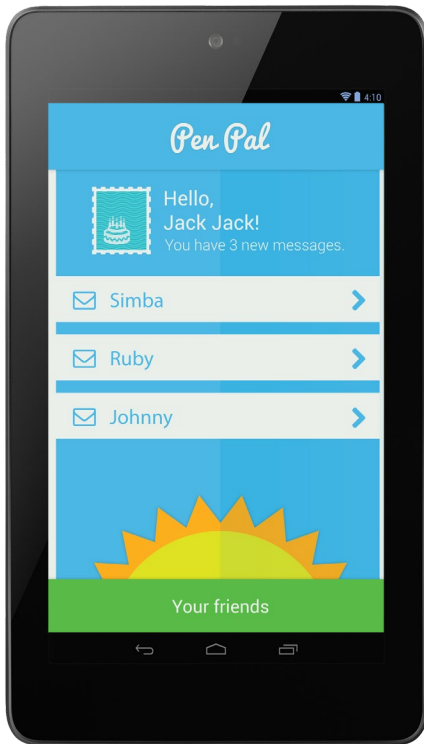He sees a timer while he is speaking into the micorphone

After recording, the user can either redo his message or send it right away.
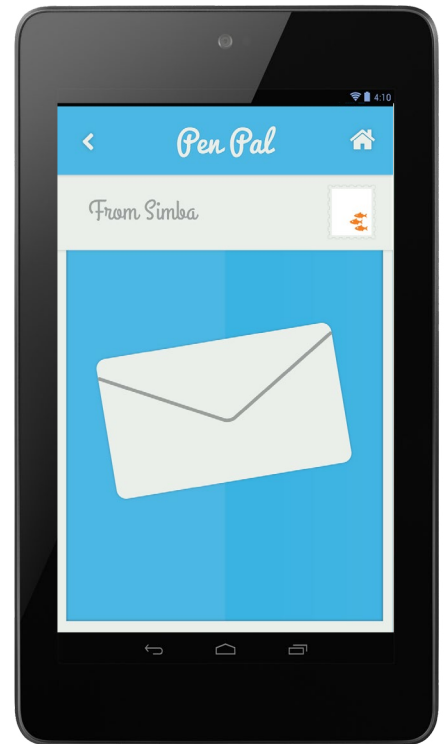
The message has been sent!
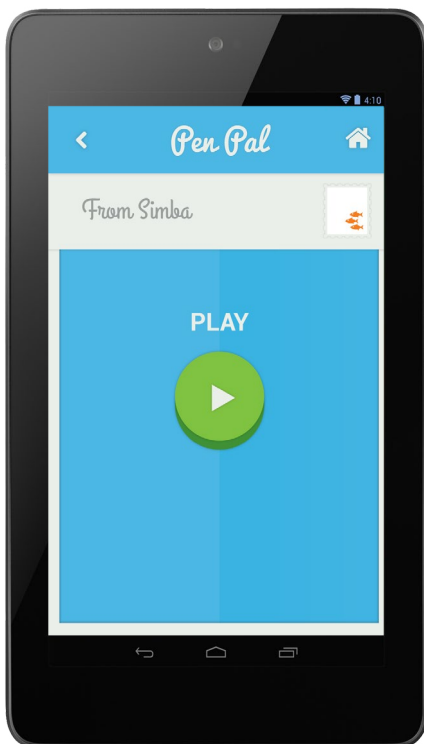
RECEIVING A MESSAGE

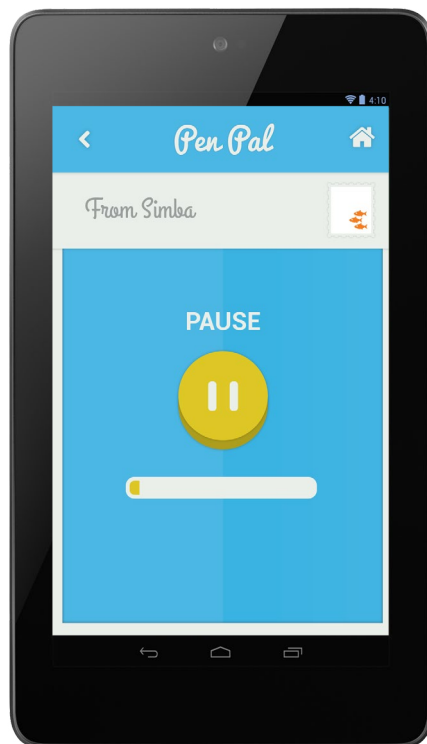Jack Jack has three new messages. He can click on a message to go to open it.

In order to read the message, the user must click on the envelope in order to open it.
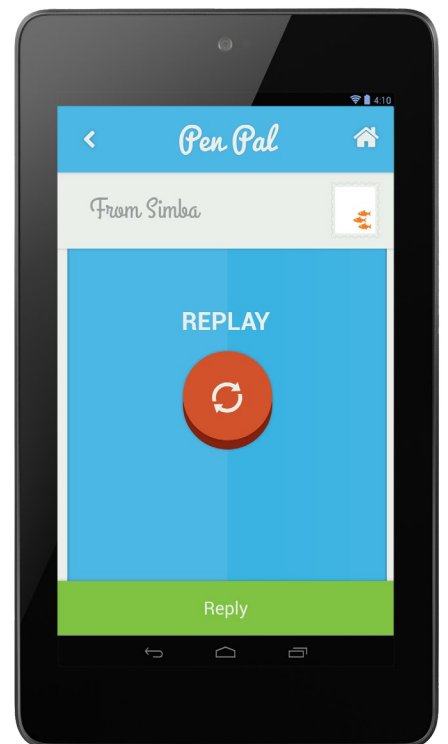

There is an animation that flips the envelope over and opens the letter.

For a voice recording, the user is given a simple play button.

He can pause the recording.

After the entire recording has been played, the user can either reply to his pen pal or replay his message.

BRANDING

Pen Pal

BRANDBOOK

COLORS

PRIMARY · SECONDARY

BLUE	TAN	YELLOW	GREEN	ORANGE	RED
R: 78 G: 182 B: 226 #4EB6E2	R: 234 G: 239 B: 233 #EAEFE9	R: 78 G: 182 B: 226 #4EB6E2	R: 126 G: 194 B: 66 #7EC242	R: 251 G: 175 B: 31 #FBAF1F	R: 210 G: 82 B: 43 #D2522B

Generally, you will only need to use the primary colors, blue & tan. Blue works well as the background color with tan being an accent. The tan is good for text on a blue background.

If needed, you can supplement the two primary colors with a secondary color. This secondary color is good for small accents.

You can also use the wide spectrum of colors for any illustration or to denote positive or negative feedback. This shade of red is good for error messages while green is good for confirmation.

TYPOGRAPHY

ROBOTO TYPEFACE | PRIMARY

LARGE HEADLINE
40PT / ROBOTO REGULAR

MEDIUM HEADLINE
32PT / ROBOTO REGULAR

SMALL HEADLINE
22PT / ROBOTO REGULAR

Here's some paragraph text
13PT / ROBOTO LIGHT

PACIFICO TYPEFACE | ALTERNATE

Alternate Headline
40PT / PACIFICO

Pen Pal

BRANDBOOK

LOGO USAGE

PRIMARY
For dark backgrounds

ALTERNATE
For light backgrounds

Pen Pal

Pen Pal

TEXT ONLY

Pen Pal

ICON ONLY

Pen Pal

BRANDBOOK

TECHNICAL CHALLENGES

One challenge that we faced was dividing the different types of messages into different layouts in a way that would modularize the code. For example, a user who wanted to send a message could choose among drawing, typing, and talking. To allow the user to perform these actions, while making it easy for us to keep a consistent layout throughout the app, we decided to use a combination of Fragments, Frame layouts, and software engineering techniques such inheritance and delegation in order to achieve this process. With this approach, it was also possible to divide the code work among our team members.

The biggest technical challenge we had with the code was making it backwards compatible for android devices of all ranges. We had previously implemented our app to work with the Action Bar. However, the Action Bar required at least an android API version of 11, and our physical devices were only version 9. We decided to implement the backwards compatibility so that even kids with older phones could use our app.

In order to compile the code for the phone, we had to import both the Pen Pal project and the compatibility support library into the Eclipse workspace. Then, we had to add the two support jar files in the library folder of the support project to the build path, and configure the build path to order and export those files. Finally, we went into the Pen Pal properties, went to the Android option, went to the library tab, and added the support library. We would then be able to successfully compile the code and run it on the physical device.

The phone requires internet access in order to run the meet a pen pal task. However, if the phone does not have internet access, the user receives a visible error message that he is not on the internet, and has the option to try again.

Our mission with the Pen Pal app is to allow children around the world to develop their awareness and knowledge of different communities. Our app provides younger students with a safe and easy way to communicate with kids from other cultures. They can express their creativity and ideas in many ways, and they can share these ideas through messages with other children. By using our app, kids expand their knowledge of the world and of the different kinds of people in it.

One of the more important aspects of Pen Pal is the security. In order to ensure the safety of our users, we require teachers to register their students with the app. This keeps the kids safe and prevents unwanted people from using it. Parents can relax with the knowledge that our application is secure.

In Pen Pal, we focused on allowing children to easily find and communicate with pen pals from all over the world. With a press of a button, they are connected with another student who has different life experiences and cultural backgrounds.

They are able to send and receive messages from their new pen pals through texting, drawing, or talking. With these three methods of communication, the kids have a multitude of ways of expressing themselves and of interacting with kids of other languages.

By using Pen Pal, our users will be able to learn more about other places in the world while making new friends and forming lasting relationships. The users that we talked to about the initial implementation of our application were excited with the idea of talking with people from other countries, and they looked forward to being able to find new friends. We can tell that students will be excited to use Pen Pal, and they will get to experience other cultures in a way that they would not have previously been able to. Pen Pal will teach the children the technological skills of using a mobile app, the ability to communicate in a connected society, and the value of forming strong friendships. The mobile application that will prepare the next generation for a technologically globalized society is Pen Pal.