Quest

Making digital communication meaningful and fun

CS194H Final Prototype Report

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Quest

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Problem

Long distance relationships and friendships are hard to maintain. Texting and social media interactions are simply not appropriate mediums for supporting meaningful and engaging messages and conversations, emails seem too impersonal and letter-writing takes too much time. For the population of people who live too far from their friends to see them often enough to "stay in touch," no ideal method of communication exists to support intimate and gratifying correspondence. The same issue exists in situations when friends living any distance away would like to share more meaningful messages, or for those who would simply like to have more fun sending/receiving messages with their friends.

Solution

With Quest, we are quite literally "making digital communication meaningful and fun!" We have attempted to combine the delayed gratification a recipient feels when receiving a letter with the utility of receiving a text instantly on a smartphone. This is achieved in our app through a shared AR scavenger hunt experience among close friends/partners. At the end of a distance-appropriate journey, the recipient will open their gift containing a meaningful message from the sender, including anything from photos, videos, gifts, plain English, or even an interactive game. Quest is the happy medium between letter-writing and texting that promotes a more meaningful and engaging form of digital communication.

(User completing a quest)

Quest

Tasks

At the beginning of the quarter, our three tasks were the following:

- Task 1: Design a Quest and send
- Task 2: Navigate to Location
- Task 3: Open a Message/Gift

After some deliberation and receiving advice from our teaching staff, we realized that Tasks 2 and 3 were both "partial" in the sense that a user would not use Quest with the intention of simply navigating to a location or opening a gift. Instead, they would want to actually complete a quest that they had received. As a result, we changed our simple, moderate, and complex tasks a bit:

- Simple Task: Check inventory of received and sent quests
    - Navigate to the gallery to view previously-completed quests

- Moderate Task: Send a Quest
    - Design a message and an AR scavenger hunt with a particular friend in mind

- Complex Quest: Complete a Quest
   - Task 3: Navigate to a location and open a message/gift

We elected to make these our tasks because they felt like the majority of the actions one would take while using Quest. Quest is an app that embodies significant messaging between two individuals who have a great relationship but are some distance away. We thought to ourselves: if *we* were in the user's shoes, we would want to be able to send, receive, and look back on these quests shared with our friends and significant others. With their needs in mind, we attempted to tailor our app to the user in the easiest and most thoughtful way possible.
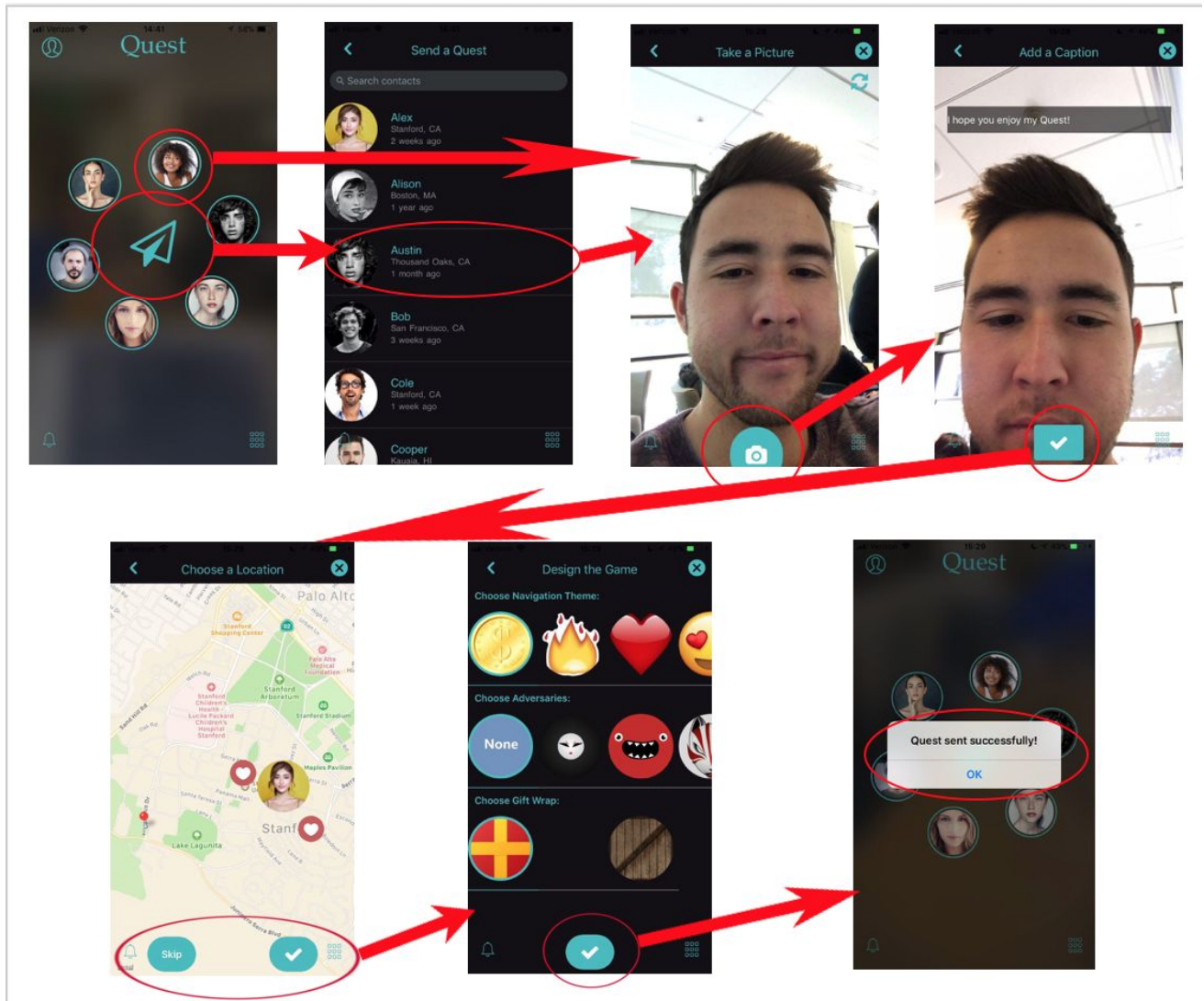
 Quest

Task Flows

Red Circle - Click that button/region
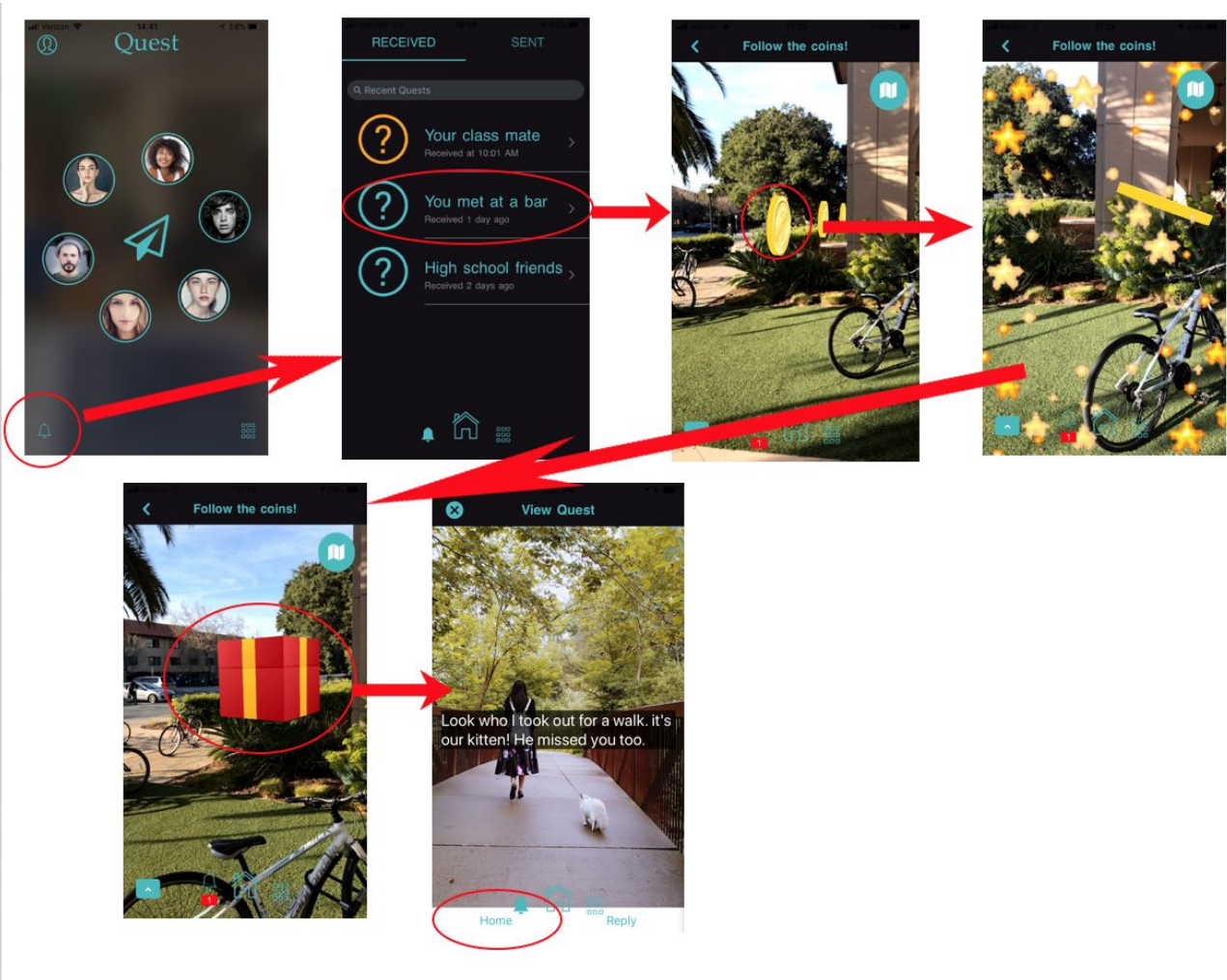Red Arrow - The prototype will navigate you to the following interface

Checking inventory of sent and received quests
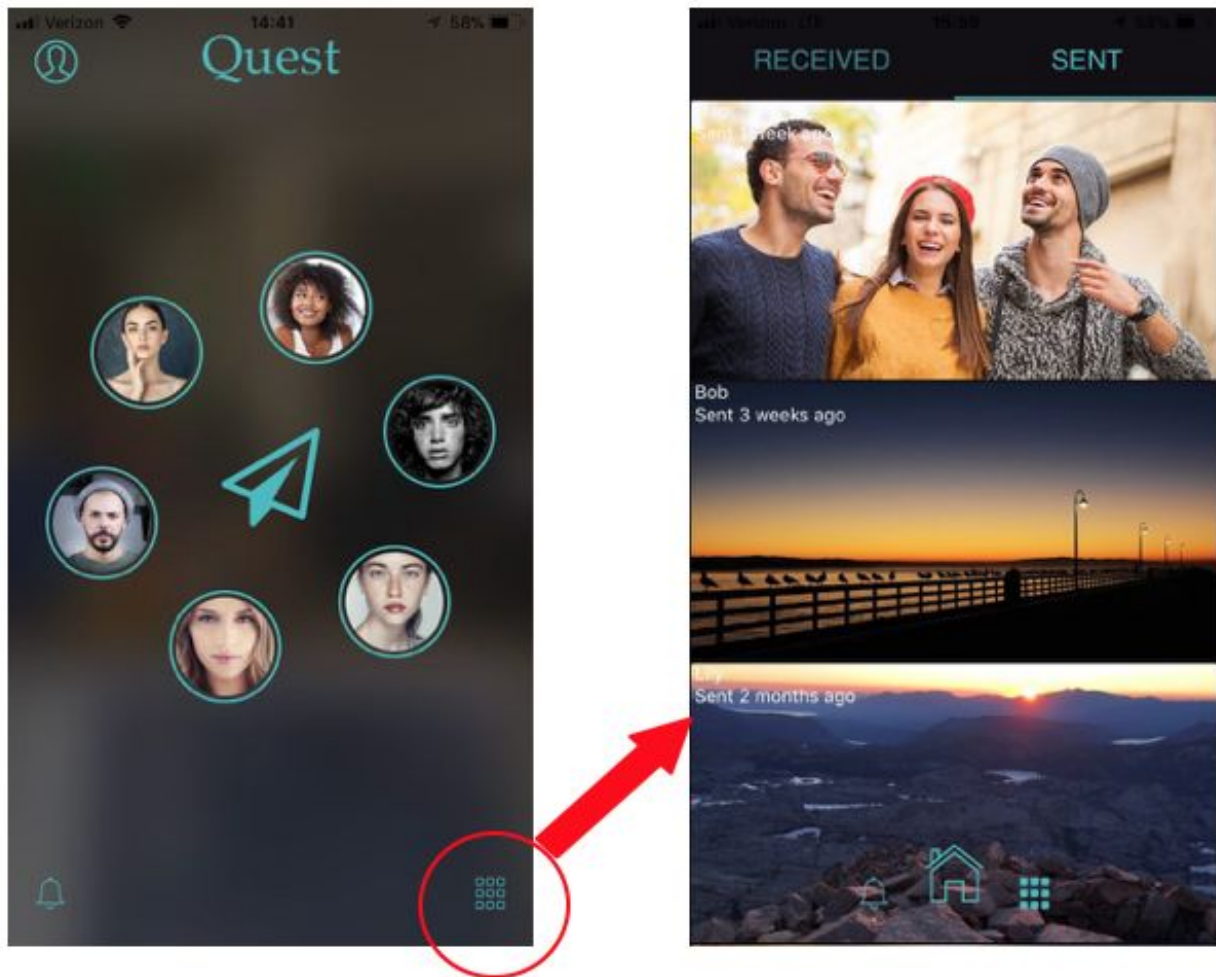
Quest

Sending a quest

Quest

Completing a quest

Design Evolution

Evolution of Look and feel

Before CS194H, Quest had been birthed from an idea to a high-fidelity prototype. The inspiration for this app was maintaining close relationships with people far away. The previous Quest team had a couple aspects that they especially valued through their low-fi prototype: valuing the selection of the recipient over any other part of sending a quest and the functionality and the feel of the AR journey/experience. Few changes were seen from the initial ideas to the low-fi prototype; as the previous team wanted to hear feedback on the low-fi before making any large changes to the UI flow.

Upon creating the medium-fi prototype, the majority of the interfaces were made, but none of the functionality existed. However, the medium-fi was valuable in giving the team an idea of how the navigation of the app would flow - all of the tasks were clearly included. This prototype iteration was highlighted by an aesthetically-pleasing landing screen, with a large button in the center prompting a user to create a quest and the user's gallery in the background.

From the medium-fi to the high-fi prototype version 1, the team ended up removing their landing screen, since it caused confusion in the users. They changed their accent color from yellow to orange, which seemed a little less intense. They also hardcoded user data to give prototype users a more realistic feel while using the app. It was a sufficient high-fidelity prototype; however, upon trying out the app at the beginning of this class, we found severe navigation issues and the lack of a true theme. We knew we could make major leaps and bounds in ten weeks!

Themes

Original theme

Quest

At the beginning of the quarter, our prototype was primarily focused around functionality. A clear theme did not yet exist - Quest contained only a rather barebones color scheme (a white background with an orange accent/actionable color) and a few AR assets (a gold coin, a wooden box, etc). Upon reflection and usability testing, we quickly realized and decided that among other things, the aesthetic of our app needed remodeling. We cycled through a number of potential options for themes, some of which are captured in the figures below:

Potential theme 1: Magical adventure game

The box and gold coin seemed to fit a medieval theme, so we considered a magical, medieval adventure game.

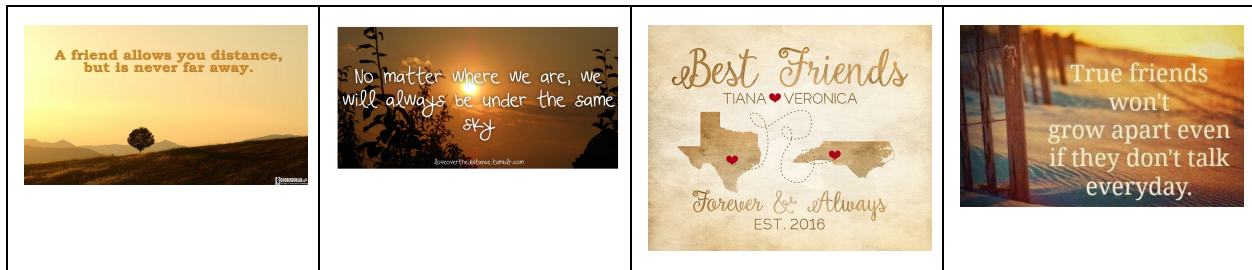Potential theme 2: Treasure hunt

The box and gold coin also seemed to fit a treasure hunt, pirate theme. This felt particularly fitting, since our scavenger hunt game had a treasure at the end.

Quest

Potential theme 3: Long distance
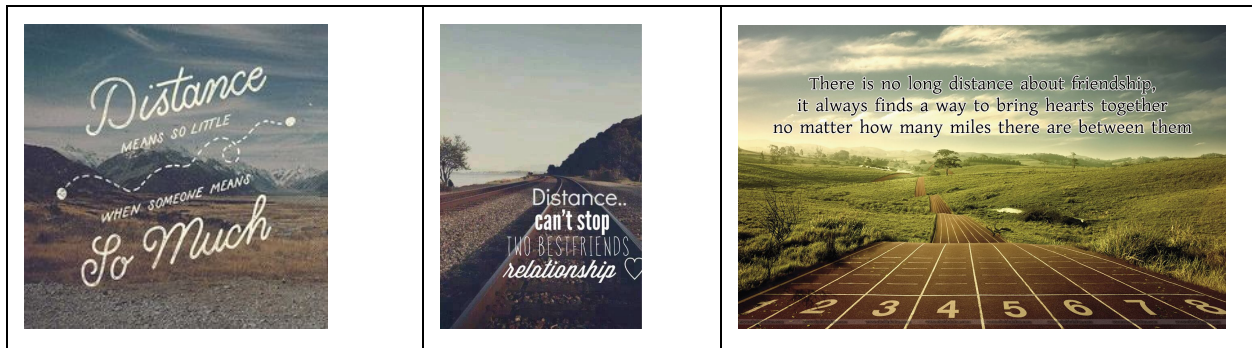
We also considered a forlorn, "long distance" mood. This was quickly deemed too depressing.

Potential theme 4: Close relationships

Finally, we also considered a "far away best friend" theme.

After playing around with these different ideas, we elected to try implementing "Potential theme 2," incorporating coins on the AR scavenger-hunt path, a treasure chest containing the message at the end of the quest, and even a ghost as an optional adversary for the recipient to "face" on their journey. Our high-fidelity prototype version 2 contained a theme was centered around the gamified feel of the tasks. In order to properly adhere to this theme, we gave the app a dark grey background with a yellowish-gold accent color. This seemed appropriate for creating an atmosphere that promotes games and having fun, and for instilling the feeling of playing a game in the user. We also put a large button that resembled a map inside a crosshairs symbol in the middle of our landing screen. This was intended to resemble creating a quest for a friend, since they would quite literally be following coins (that they could walk through or shoot with the crosshairs in their Quest experience) while traveling to a location (hence the map) determined by the sender.

![Quest logo] **Quest**

Final theme: Sleek, Simple, Lighthearted
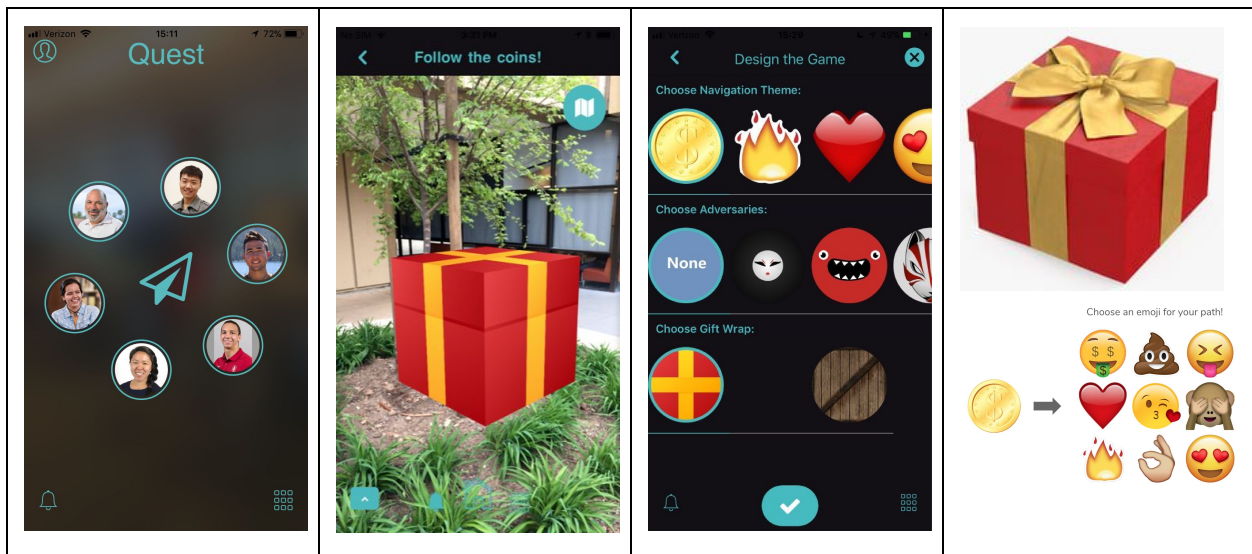
Screengrabs showing the implementation of the final theme.

Though the treasure hunt theme was more unified than where we started, our team felt that we had not quite captured the feeling we wanted to evoke. Our mission statement was, "Making digital communication meaningful and fun". The treasure hunt seemed fun - but did it evoke "meaningful relationship"?

We felt that the treasure hunt theme was too far in the arena of games and adventure, and did not evoke relationships. So, we went back to the drawing board once again. We ultimately decided to make our design sleek, friendly, and playful. Our reasoning was as follows:

- Since our app featured innovated AR, we wanted the interface to be <u>sleek</u>. This was important so that on first glance, people could see that they were interacting with an app that was modern and cutting edge.
- Since our app was about connecting partners and friends, we wanted the theme to be friendly. So, we decided to go with teal as the new accent color, because we felt teal evoked happiness and friendliness.
- For the same reason as above, we added "best friends" to the landing screen, emphasizing the people/relationship-oriented nature of our app.
- Since our app was supposed to promote surprise and adventure, we wanted to add visual assets that were playful. We changed the default box to a gift box, and added emojis to be placed along the path.
- And finally, since our app was about meaningful connection, we wanted to add as many opportunities for personalization as we could. So, we put in multiple options for objects to be placed along the path, as well as multiple representations for the final Quest object.
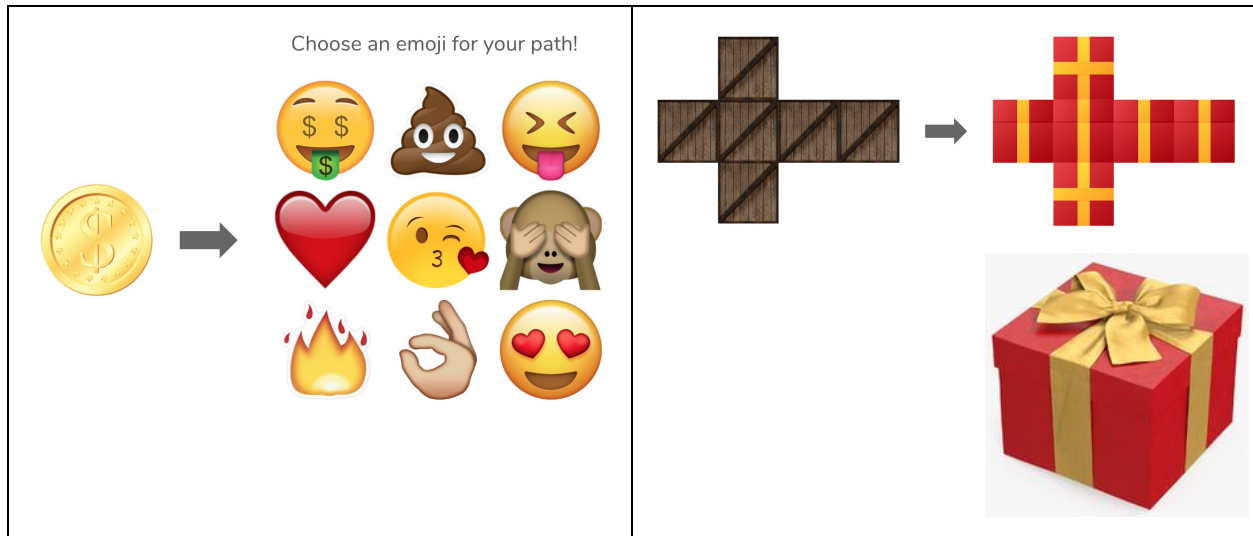
Instead of just coins, we added the option for various emojis to be placed on the path. Instead of just the drab wooden box, we made a gift box the default. The right side panel shows how we created 2D images to be rendered as a 3D box in AR space.
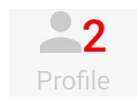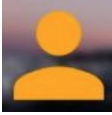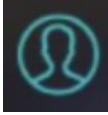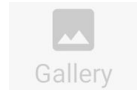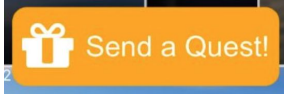
Icons

Another way in which our look and feel evolved was in our Quest app icons. Because of our simple swipe navigation, the icons were the only visual indicator of what each page did. During user testing we found that the icons could very quickly cause a user to misinterpret a page, and thus change their expectations for what information they would find on the page. Thus, it was vital that our icons communicate clearly and succinctly the purpose of each page.

Some icons we found to be successful early on (the profile and gallery icons, as seen in the Development of Icons table below). These did not change much from early versions of the icon, besides slight changes in visual design to match the sleekness or color theme we were attempting to implement in the app. On the other hand, other icons (the 'active quests' and 'send a quest' icons) took many varied forms before we landed on our final icons. Our team went through a lot of discussion on what these icons should be.

Take the "Active Quests" icons, for example. At first this page did not exist, so in the earliest versions, there was no icon. Then, we tried using a gift box icon to represent the Quests. However, the gift box icon wasn't standard, so users may not have intuitively understood what it meant, so we shifted to chat bubbles (which users could recognize). However, the chat bubbles evoked something else entirely; users thought they were entering a messaging interface. This was not right. Then we decided that they way users would know these were "Active Quests" was if it looked like a notification icon. Upon making this change, users were much more able to guess the intent of the page.

Development of Icons

Page	Version 1	Version 2	Version 3	Version 4	Final Icons
Profile					
Gallery					
Active Quests					
Send a Quest					

Surprisingly, by having these conversations about the icons, we clarified the purpose of the pages as well. For example, the page we are now calling "Active Quests" was also at various times referred to as "Recent Quests" and "Notifications". Our discussion around the icons helped us focus the purpose of the page, which in turn also helped us land on an appropriate icon to represent it.

Landing page
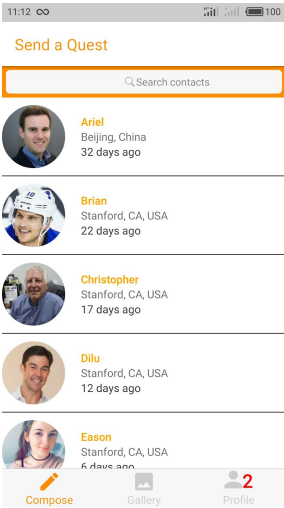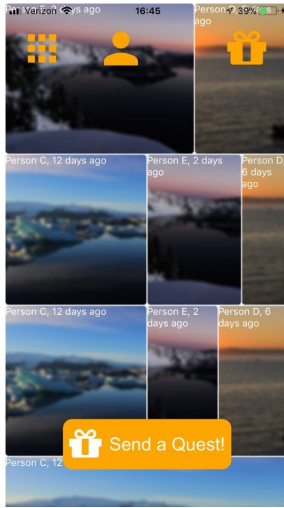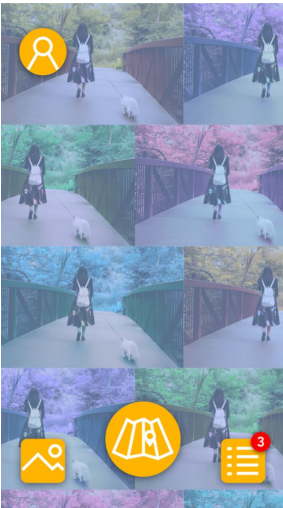
The landing page was one of the key areas we iterated on with the team. It became clear from user testing that the landing page of our original prototype was insufficient. When users opened the app and immediately saw a contacts list on the landing page, they had no inkling of that clicking on a friend would start the "send a Quest" task. Nothing about the contact list on the landing page conveyed the idea of a Quest.

At first, we considered having an opening tutorial upon a user's first use of the app. Quickly, however, we decided that a tutorial would be cumbersome, and would feel like a barrier between the user and their first action. Besides, there was a high likelihood that the user would swipe mindlessly through the tutorial without reading it. So, we strove to make the landing page self-evident. How could we design a landing page that would help users infer the purpose of Quest?

In our first high fidelity prototype, we tried to convey some meaning by displaying the gallery of past Quests in the background of the landing screen. We had a large "Send a Quest!"

button at the bottom to serve as the call to action. The single call to action button was an improvement, and our users were able to navigate this version of the app quite well. However, it was clear that our design wouldn't win us any awards for aesthetics. We knew we needed a change.
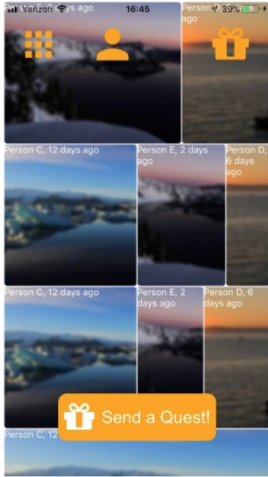
We went back to low- and medium-fi prototypes to do more iterations on the landing page. For a while, we kept the gallery in the background, and made small improvements to the button positions and icons (e.g. Med-fi Prototype 1.1). However, even with the better icon positioning, this felt cluttered. The gallery in the background simply wasn't working visually. In addition, it made the distinction between the landing page and the gallery page confusing - what was the point of having the gallery visible in both places? We continued to wrestle with ideas.

Original Prototype	High-fi Prototype 1.0	Med-fi Prototype 1.1
Original landing page, with tab navigation	Large "Send a Quest" button, and pictorial icons to navigate to Gallery, Profile, and Active Quests. Photos of quests used as background image.	Changed large "Send a Quest" button to a map icon. Moved buttons around to mimic Snapchat's button positions. Tried different icons for Gallery and Active Quests. Photos of quests used as background image.
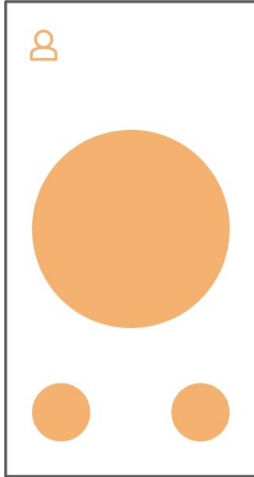
Next, our team thought - if we have one focal action that we want the users to do (send a Quest), then we should highlight that focal action, much like Shazam (the music identification app) does. Furthermore, if we wanted the landing screen to immediately communicate something about our app, we could have our landing screen mimic the AR view. We could use the visual theme suggested by the gold coins in our AR view, and to make the connection with the AR view even more salient, we could make the landing screen button mimic the interaction

of shooting a coin in AR! This AR-like view solve our problem of background clutter by removing the gallery in the background, and instead having a simple camera view (Low-fi Prototype 1.2).
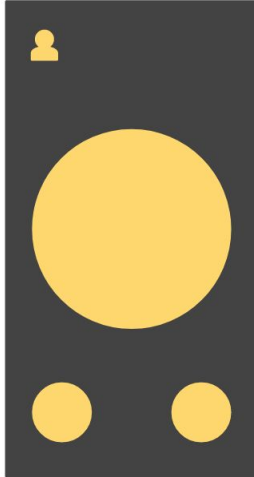
Low-fi Prototype 1.2
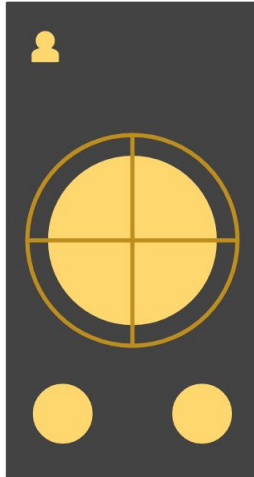
| High-fi #2 landing screen | Highlight focal action: create a quest | New color theme to match game aesthetic | Incorporate AR interaction |

One low-fi proposal.

We implemented this idea (High-fi Prototype 1.3, below). We realized in practice, though, that the crosshairs were confusing. Crosshairs didn't feel right - shooting a coin did not equate to sending or retrieving a meaningful Quest; it was just one small piece of the game interaction. Instead, a quest was an adventure, a scavenger hunt with a gift at the end. This was when we tried the treasure map (High-fi Prototype 2.0).

User testing at this point told us that the focal "Send a Quest" map button was highly intuitive. When we asked users to complete Task 1 of sending a quest, there was no quibbling - they immediately clicked the center map. Moving this button to the center of the screen was a success.

After all of these changes, we found ourselves reflecting on our treasure hunt-themed app, and feeling that something had been lost. While we had managed to capture the scavenger-hunt part of the experience, no longer did our app indicate anything about meaningful relationships. While our very first prototype had opened to the contact list, our High-fi Prototype 2.0 landing page with the treasure map had nothing to do with friends or relationships. Our team took a vote, and decided that the treasure hunt theme had to go. It was not communicating the ethos of Quest.
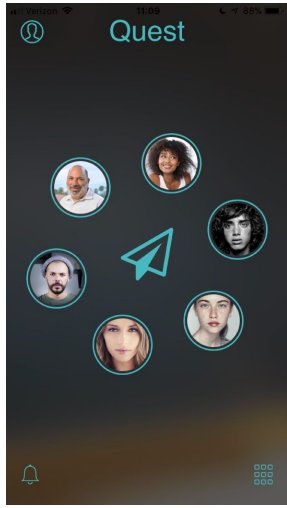
Quest

High-fi Prototype 1.3	High-fi Prototype 2.0
Switched sides of Gallery and Active Quest buttons. Tried a different icon for Active Quests. Nixed the gallery in the background, and instead used a camera view. Added crosshairs to start the "Send a Quest" task.	Changed the crosshairs to a picture of a map to indicate "Send a Quest". Changed the Quest font on the landing screen.

This brings us to the final stages of the landing page design, which led us to the landing page we have today. We wanted to keep the general layout, with the "Send a Quest" button as the central focus. We debated what a central icon might be (Hands giving a gift? A flying gift box?) We decided that the paper airplane indicated "send" in a universally understood way. We wanted to keep the simple camera view background. But we also wanted to bring relationships back to the fore. But how? We debated this question for a good long time. We went to look at other apps, even other long distance relationship apps, to see what they showed on their landing pages. Here are some of the options we considered:

One single, simple button	A few navigation buttons	Relationship memories	Relationship statistics	An anniversary countdown

Landing pages of other apps, including some apps specifically for long-distance relationships.

It was while we were looking through these relationship-focused apps that we found a wedding planning app. In this app, there was a page that allowed users to create table arrangements for the wedding. When we saw this image, immediately recognized that this was how we could bring relationships back to the fore, while keeping our central "send" button. We would have the profile images of the user's "favorites" on the landing screen. Thus, it was this visual image that inspired the ultimate design of the final landing page.

	Final Landing Page
Visual design of a wedding planning app that helps users create table arrangements for their wedding.	The final landing page of the Quest app, which drew inspiration from the table arrangement layout. The user's favorites are displayed on the landing screen.

Evolution of User interaction in Quest app

Besides changes to the aesthetics of the app, we also made significant changes to the user's interaction with the app. We describe this evolution below, as well as the visual design decisions we made in the final interface to visually communicate to the user the appropriate navigation behaviors they should make.
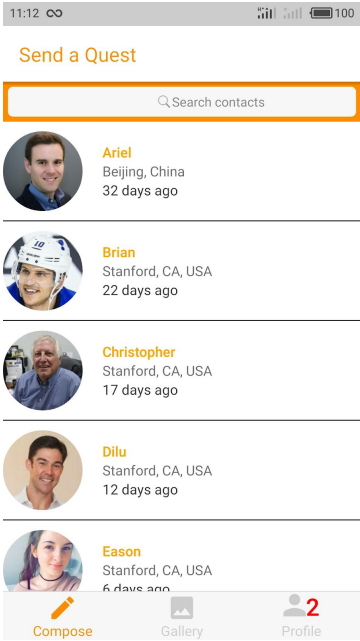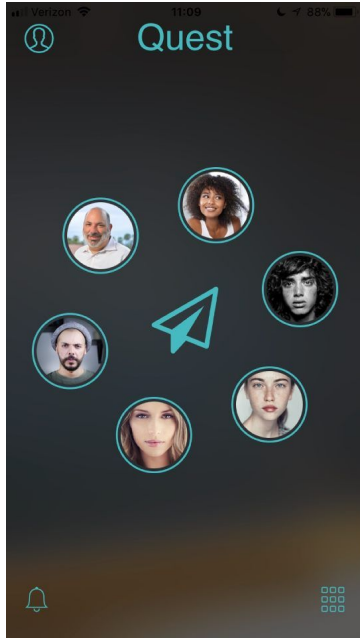
Navigation

 In the earliest prototypes of the app, the user navigated from page to page via a tab navigation bar along the bottom of the screen. This was intuitive to users, but looked clunky and old fashioned - it did not evoke modernity and sleekness as we hoped.

 So, we took inspiration from the navigation interactions of the apps we used ourselves. Specifically, we looked at apps that had common thematic elements with Quest - media sharing apps (e.g. Instagram), media creation apps (e.g. iMovie), communication apps (e.g. iMessage, Facebook Messenger), and more. Ultimately, though, we felt that the app that was most aligned with what we wanted for our app was Snapchat, for its simplicity and fluidity. Thus, we took Snapchat as our model.
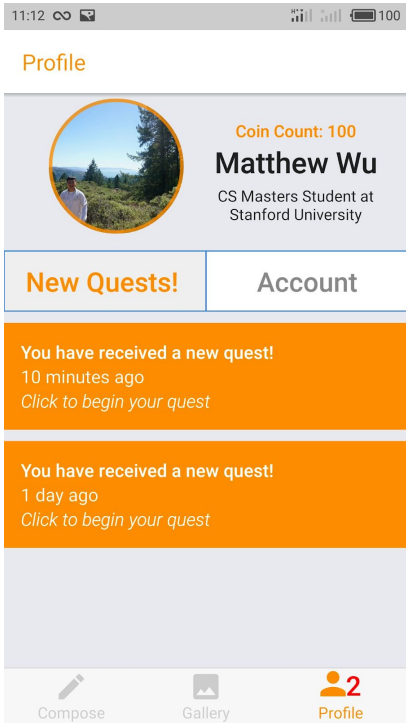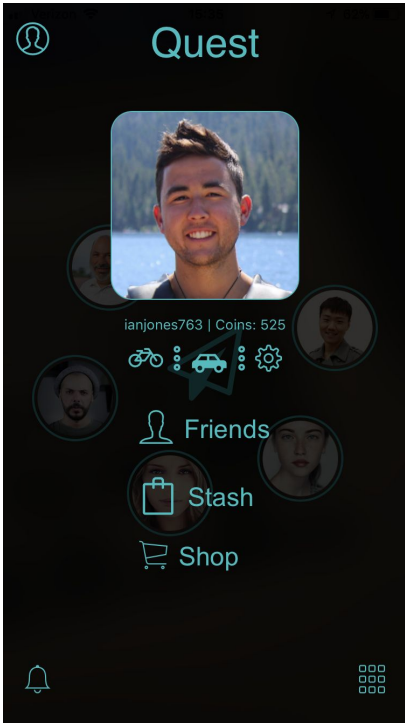
 Snapchat's navigation was simple and clean. It used icons at each corner to represent the pages to the left and right, and had a large button at the bottom of the screen for the focal action (sending a Snap). The background was simply the camera view, without any additional clutter. We took all of these elements as inspiration, and implemented a similar layout and interaction for our icons and swiping.

 They three key modifications we made to Snapchat's interface were (1) to move the button for our focal action (sending a Quest) from the bottom of the screen to the middle, (2) to open to a blurred camera view, instead of an in-focus view, and (3) place the users' favorite friends in a circle around the central "send" button. We explained these modifications in our discussion of the evolution of the landing page, previously.

Bottom tab navigation bar	Icons and 3-tab swipe navigation

Main Pages

We made significant changes to the other pages in the app as well. The primary goal with these pages was to segregate functionality onto separate app tabs and pages. For example, initially, the Profile page contained not just persistent information about the user, but also newly received Quests. The Profile page was where users expected to find such information. So, we dissociated these two functionalities into the "Profile" page and a new "Active Quests" page.
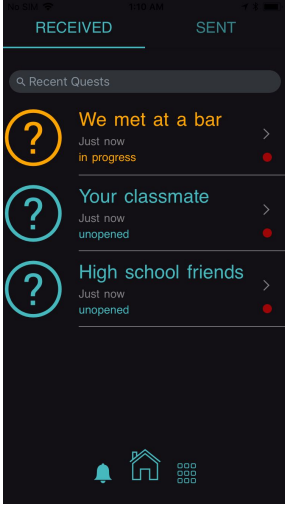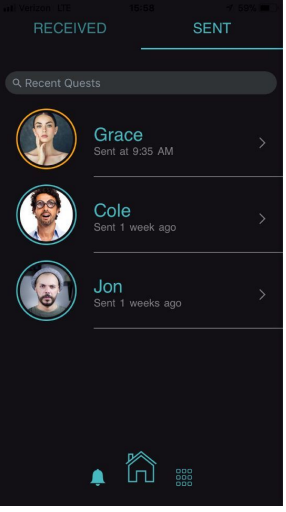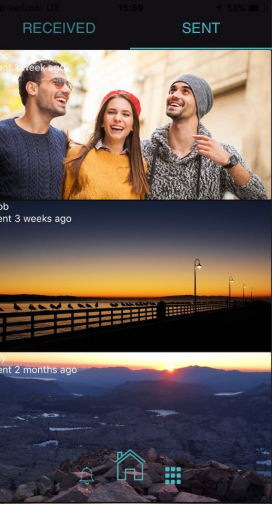
Original Prototype, Profile page	Final interface, Profile page
In the original profile page, we had no distinction between the profile page and recent activity.	In the final app, we created a standalone profile page that only had persistent, user-level information about the user. Recently sent and received Quests were moved to their own "Active Quests" page.

On the Active Quests page, we also made quite a few changes to the way Quests appeared to the user. Originally, the tab was labeled "New Quests!". Now, Active Quests were indicated with a notification icon, with a red notification badge to flag any recent activity. And originally, the app only displayed newly received Quests - it did not have any way to display the state of in-progress Quests or recently <u>sent</u> and active Quests. In addition, the newly received Quests were very explanatory and text-heavy; they explicitly instructed the user to "Click to

Quest

begin your quest". These explicit instructions were only necessary because the interaction was not self-evident from the manner in which newly received Quests were displayed.
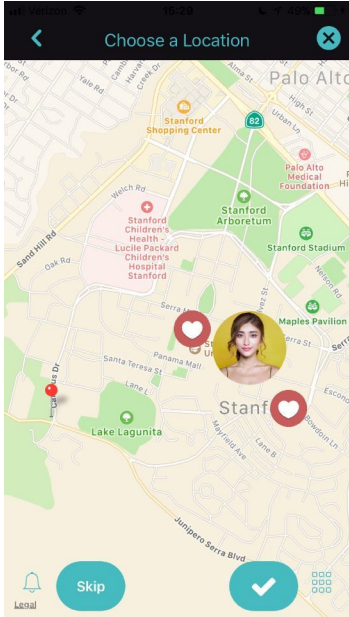
All of these things were changed in the final app. For "Received" Quests, we removed the instructions to "Click to begin your quest", and we added the functionality for a sender to input a playful, anonymous descriptor of the sender's identity instead. We made it clear that the Quest had been sent by an anonymous person with a question mark in a placeholder circle where a person's photo might usually go. We displayed not only newly received Quests, but also in-progress received Quests, and we visually distinguished these two things with orange and blue accent colors. For "Sent" quests we kept the same essence of the visual design as in the "Received" tab, but replaced question marks with friends' profile photos, and the anonymous hints with friends' actual names.

The Gallery we made to mimic the two-tab "Received" and "Sent" tabs that we had on the Active Quests page. Whereas Active Quests showed new and currently in-progress Quests, the Gallery was where we displayed completed Quests. So, users would go to the Gallery if they wanted a fun trip down memory lane. Before, the Gallery had Quests displayed in multi-column grid format. We changed this so that each Quest spanned the full width of the screen.

Final, Active Quests: Received	Final, Active Quests: Sent	Final, Gallery: Received	Final, Gallery: Sent
Received Quests appear to the user anonymously, and profile images are masked with question marks. Orange Quests are unopened, blue Quests are in-progress.	Sent Quests are also displayed, so that the user can monitor the status of active sent Quests. Again, orange and blue denote unopened vs. in-progress Quests.	The Gallery was also split in the same way that the Active Quests tab was split: into Received...	...and Sent. The purpose of the Gallery was for completed Quests, to sequester Active, in-progress Quests from completed ones.

![Quest logo] **Quest**
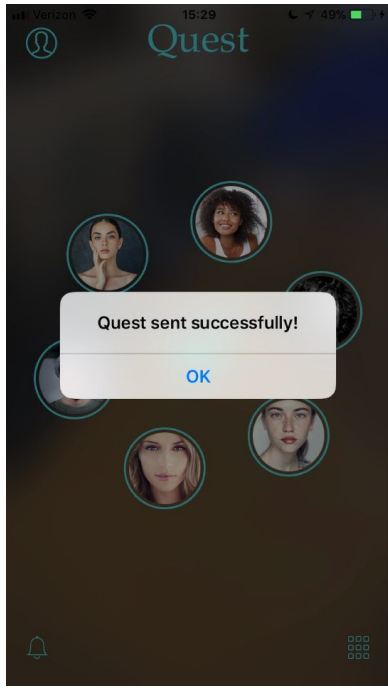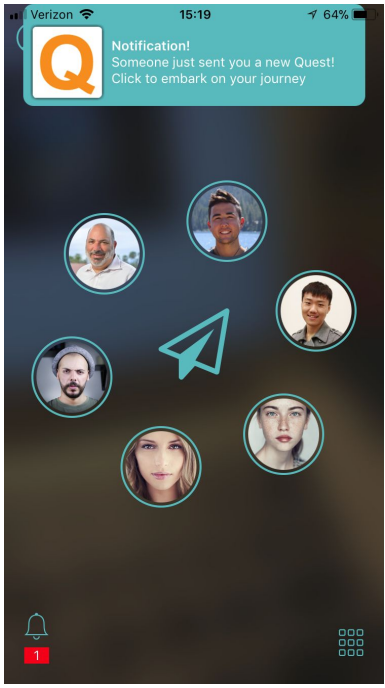
Subpages

One sub-page we modified was the "Choose a Location" screen of the Task 1 flow. During our lab usability test, we found that this page was one that users frequently got tripped up on. The tags that we initially used to mark the Quest recipient's location (the black profile icon) was often mistaken for the user's own location. In addition, the orange bubble used to flag a location-of-interest was confusing. We replaced the black profile image with the recipient's profile photo, and changed the orange bubble to a pin that users could move around to drop the Quest at any location.

Original prototype, "Choose a Location"	Final app, "Choose a Location"
Black profile icon to represent recipient's location and orange bubbles were confusing.	Changed the icon to the recipient's profile picture, and changed the organize bubble to a drag-and-droppable pin.

Feedback resulting from actions in the app

A simple confusion that users often had that we designers overlooked was that users were unsatisfied when they completed the "Send a Quest" tab because they received no feedback that the Quest had sent successfully. They would simply be returned to the home page of the app at the end of the Quest. We added a pop-up notification of a successful send to
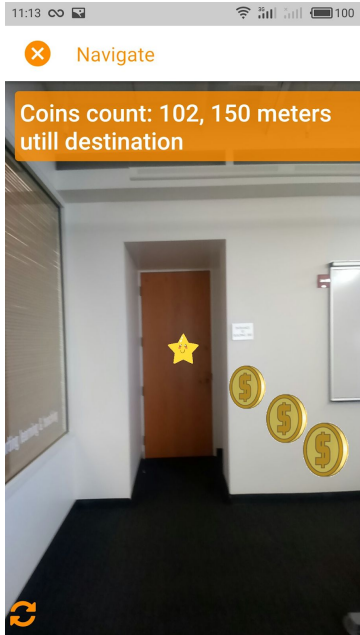
the sender, and also implemented the back-end server so that the send would trigger a notification on the recipient's side as well.

Added feedback to the sender that a Quest was sent successfully at the end of Task 1.	Upon successful send, the back end server triggered a notification on the recipient's end of a newly received Quest.

Evolution of User interaction in AR

One unique challenge our project group faced was that not only did we have to create an intuitive user interaction for the navigation in the app, we also had to make the user interaction intuitive in AR space. Suddenly, we were dealing with users who were looking <u>through</u> our app into the 3-dimensional world, which meant that we had to consider not only how they moved through our app screens, but also how they understood and navigated through the world through the lens of our app. There were three key points of usability that we focused on: (1) guiding the users to the start of the AR path, (2) teaching the users how to interact with the AR objects, and (3) helping users by altering their Quest depending on whether they were indoors or outdoors. We discuss how the user interaction for each of these evolved, next.

A side note here - at the very beginning of the quarter, we had not yet implemented real AR! The floating coins were simply fixed images on a camera view in the app, rendered with linear perspective to appear as if they were receding in space. Getting objects in AR space was already a huge step forward in the functionality of our app:

Original Prototype	High-fi Prototype 1.0
	A blurry screenshot of the coins being rendered in AR space in Quest for the first time!

Guiding users to path

We learned from our lab usability test that users had trouble finding the AR coins indicating the start of the path. Users would receive a Quest, open up to the camera view, and see nothing on the screen (High-fi Prototype 1.0). This confused users; as you can see, our experimenter is manually pointing with this finger toward the AR coins the user should seek.

So, for our High-fi Prototype 2.0, we added instructions to "Follow the coins!" We then learned from our field usability test that even with this instruction, which users often read aloud (meaning they had definitely read and processed the instructions), users did not have the instinct to look around for the coins. As first-time users, they had no reason to believe that there would be AR objects, and the instructions did not push them towards this realization.

And thus, for our final Quest app, we kept the instructions to "Follow the coins!" but also added **arrows floating in AR space**. Immediately, this signaled to users that there were AR objects (the arrows themselves). And furthermore, the arrows pointed to the AR objects of interest: the coins! With the combination of these two prompts, users were able to successfully seek and turn towards the start of the AR path of coins or objects.

High-fi Prototype 1.0	High-fi Prototype 2.0	Final AR View
Previously, there were no indicators on screen to guide the user to find the coins. New users, especially, did not know to look for the coins.	AR view in high-fi prototype 2.0. Added a caption up top to tell users to "Follow the coins!" Still, these instructions were insufficient.	AR view in final prototype. Arrows in AR space were added to point users to the first coin.

Interaction with coins and objects along path

Our early lab usability test also taught us that "bumping" AR objects to collect them did not provide sufficient functionality. The AR objects sometimes rendered in physically inaccessible places: inside of physical objects (e.g. Christmas trees), or along paths that users could not follow (e.g. out a window). We had limited capacity to change where the objects rendered in AR space, since the object placement was determined by the path dictated by Google Maps.

So, the innovation we added was to keep the "bumping" interaction, but also to add a set of crosshairs to indicate that the user could also shoot coins and other objects on the path. This change actually killed two birds with one stone - not only did it enable users to retrieve inaccessible objects, it also enabled functionality that users intuitively sought anyhow - many users during lab usability tests tried to tap on the coins anyhow. By adding this "shooting" functionality, we met our users halfway.

The original prototype required that people move the phone in real, 3D space in order to retrieve the coin in AR space. This was inconvenient if the coin was inaccessible in real, 3D space (e.g. if the path put the coins in a tree, or up high)	The final prototype has crosshairs so people can shoot at the coins or emojis on the path. This matched users' expectations for the interaction, which we learned from user testing. The shooting interaction enables users to access coins that are out of reach.

Detecting indoor vs. outdoor Quests

One final, major change was that we addressed an issue raised during our class studio that we often tested with our users indoors, but that Quests would often take users outdoors as well. We realized that our path-based Quest was actually more appropriate for an outdoors setting. So, when recipients received a path-based Quest, and when we detected through GPS that the user was likely indoors (their GPS location landed on a rooftop) we notified them that they should move outside to retrieve the Quest. This would ideally reduce the likelihood that the path of coins or objects would be rendered through walls.

And then, we added a new type of Quest that was more appropriate for indoor interaction, that did not require Quest recipients to move. In this Quest-type, recipients saw hearts floating in a bobbing ocean. We did not iterate on this type of Quest as much in terms of user testing, but a lot of work went into rendering a beautiful, physics-responsive AR experience.
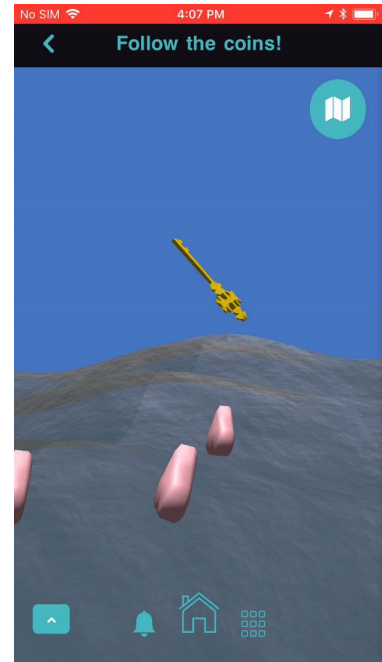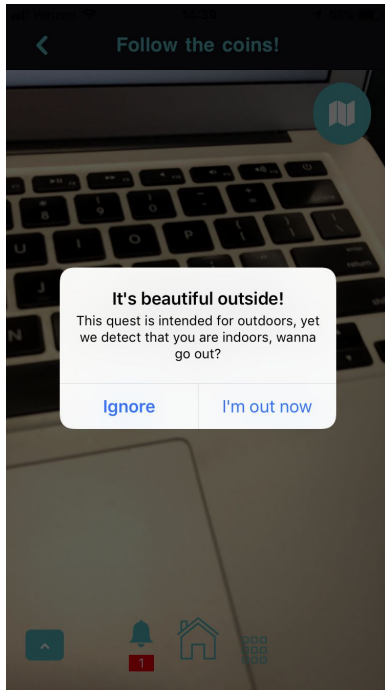
| When users received a Quest, if our GPS indicated that the user was indoors, we notified them to move outdoors. The outdoor Quest was the interaction with coins along the path. | We added an indoor Quest that did not require the users to move from their location. |

Quest

Final Interface

User Interface Design

Upon receiving feedback from our second usability test that there was still some disapproval of our design choices among our users and teaching staff, our team met for a last-minute needfinding meeting to brainstorm about what we wanted Quest to exude. As a result, the largest change from our High-fidelity prototype version 2 to our final prototype was the general feel and theme of Quest.

We thought about the true meaning behind Quest - It's an app about maintaining meaningful long-distance friendships and relationships. We redesigned the UI one last time to reflect that choice. We changed the black and yellow color scheme to one that's cooler, more comfortable, and less competitive-feeling. We kept the dark background to promote some "gaminess," but used a teal color to achieve the comfortable feel. The coins became personalized emojis that the sender could choose for the recipient to see during the scavenger hunt, and the treasure chest became a gift box containing the message at the end of the quest. This was significant because we were straying away from Quest being entirely a game, and allowing it to be a platform promoting communication and gift giving between friends and lovers. After all, a meaningful message does resemble a present more than treasure!

With letting go of the extreme gamification feel of Quest came some other interface changes - primarily the landing screen. Now the first thing one sees when they open Quest is exactly what matters to them: their best friends. We thought it was appropriate to include small icons of a users' self-chosen best friends on the landing screen since it is associated with Quest's mission: sustaining long-distance friendship and relationship. Now users can be reminded of their important friends and family every time they open our app. This felt like a better choice than just a send button for many reasons. First, the friend icon itself acts as a shortcut - when pressed, it navigates the user directly to the message creation interface and bypasses the "Select a Friend" screen. Also, it contributes to the friendly feel of our app, and we all agreed that it was a more visually-pleasing interface that promotes the functionality we wish to advertise.

Other differences from our high-fi prototype version 2 exist in the final interface as well. Our former prototype promoted the AR scavenger hunt aspect of Quest by presenting users with a large and rather ambiguous button of a map and crosshairs. Users were confused by the meaning of the large, unlabeled button in the center of the old interface, and as a result, we elected to change it a bit - to a more intuitive "send" icon. This icon still lives in the middle of the interface, but is surrounded by the best friend icons previously mentioned. If the send icon is selected, user would be able to send a quest to any of the friends in their current friend list within the app.

Finally, we tried to give our prototype a fairly neutral font: since this app was intended for friends, family, and lovers, we didn't want to make it too formal or too casual, so gave the body a font without serifs but allowed the title font to have a little more personality.

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Quest

The evaluation technique that was most valuable for our prototype was far and away the usability tests we conducted. It was after those tests that we received the most impartial and insightful feedback on what could be better about our app. Since we had predetermined tasks for the participants to complete beforehand (the same tasks that we listed above), this made the testing foolproof and as the testees spoke their thought process aloud, picking up on patterns regarding what could be fixed was simple. Then, as a group, we would convene and decide exactly how we would fix the proposed issues, and finally, implement them into our prototype. We made some decisions outside of the usability tests; however, they inspired the largest and most meaningful changes/improvements to Quest.

Functionality

In Quest, one is able to complete all three of our tasks, without the help of any wizard of oz techniques. Upon landing on the home screen, a user can tap the "send" icon to choose a friend that they would like to send a quest to. Then, they can take their picture / write their message to the friend of their choice, "place" that message in the world near the current location of the recipient, and choose the AR assets to design that particular quest. When they send the created quest to the recipient, the notification is routed and pushed through the server we built. Even if the app isn't opened, the recipient will receive a notification.

On the recipient's side, the received quest enters their inventory of Active Quests. It will be outlined in our blue color if it is unstarted, or our accent color, orange, if it is in-progress. The sender is anonymous to them until the moment they reach their destination. If a recipient taps on one of the quests in their "Active Quests" interface, they will enter AR mode, in which they will be prompted to follow the AR path given to them by the sender until they reach their message at the end. Recipients can click on the coins/emojis or simply walk through them to collect them as they venture on their quest (coins can be accumulated to buy Quest features, which are mostly unimplemented). They can also check their progress any time by simply tapping on the map icon in the AR view, showing them how far away their final destination is. Once they reach their message, they need only tap/(shoot at) or walk through the gift to view their message and discover who the sender is. During the AR quest game, the receiver can also request help from the sender, and the sender can choose to respond, basically, there is a channel for anonymous live communication during the AR journey to assist the receiver.

At this point, the quest is completed, and the received message will enter the galleries of each person - the recipient *and* the sender - respectively. Galleries are split into two different filters (sent and received quests) so users can see every quest they have ever sent or received in the app. If a user decides to click on a quest in their inventory, it will expand in a full screen view with more details.

Three primary interfaces exist in our final high-fi prototype: the landing screen (send quests), the "Active Quests" interface, and the "Gallery" interface. As one could imagine, each is devoted to a particular task - the landing screen guides users through the process of sending quests, the Active Quests screen allows users to enter AR mode to complete received quests or manage uncompleted sent quests, and the gallery allows users to reminisce on previously completed quests. This intuitive layout allows users to navigate our app with ease.

There are plenty of additional features included in our prototype as well. A beautiful and more ideal "indoor quest" option is available for users who are more lazy and don't feel like trekking in the outdoors! In this feature exists something like a virtual world, in which the user would play a game in order to discover where their message is. Also, in our outdoor quest (default) feature, a sender can choose to include adversaries for the recipient. Adversaries are like avatars that obstruct the view of the quest path (denoted by personalized emojis). Users can make the adversaries disappear by tapping on them (to attack) when they appear on the screen. As these optional features are not very relevant to the goal of Quest, we didn't include them in our tasks, but as a team we worked hard for Quest to be an enjoyable experience with options for variability and personalization. In the future our team hopes to implement more AR games, adversaries, and options for path emojis.

Using the app

There are very few actions to remember while using Quest other than tapping on the screen in order to "do" what you intend on accomplishing. Single taps will navigate a user through all tasks - sending a quest, checking the gallery, even navigating to the AR screen in which one would go on a quest. In AR mode, more options exist for user input. Tapping or walking through the AR path emojis will suffice to collect them; the same applies for the final gift.

Unimplemented features

Some features of Quest were left unimplemented, simply due to the time constraint of the class. While the profile page is functional and actually implemented in the back end of out app, everything associated with profiles (that is, the login screen, the ability to login, etc) is unimplemented. This aspect of the app was not very central to the functionality and feel we were focusing on, so it was lower priority. To remedy this issue, we resorted to hardcoding a sample set of friends in the prototype so a user would get a better feel as to what the fully fleshed-out app would look like.

As a result of the lack of profile functionality, the ability to add friends was also dysfunctional. Again, due to the scope of the class and our purpose with the app, this was an opportunity cost we faced. If we decide to continue working on Quest after this quarter, this would be the first thing on our to-do list!

Finally, the buttons on the "More details" interface upon selected a particular quest in the Gallery don't work. We simply ran out of time and didn't get to these buttons, but felt that the simple nature of being able to expand a picture based on a quest in the gallery was sufficient for the means of this prototype.

Tools Used

First and foremost, this product was built based off of the agreed-upon decisions of our team. Reaching compromises was not always easy, and oftentimes our team would meet for hours simply to discuss potential solutions to issues found in usability tests. We used Groupme

to collaborate, allocate the workload, meet, and discuss strategies. For the app itself, front end was coded in React Native, while the backend was coded with Node.js and hosted on Heroku, and we used github to manage all of our code. Quest was tested by using Expo Client on our smartphones. Tools such as Sketch, Marvel, and even pen and paper were used to envision what future stages of the prototype might look like, aka making lo-fi and medium-fi prototypes. Sketching on paper and the app Sketch were useful in designing the aesthetic of Quest, since they allowed us to easily play with different colors and layouts. React Native was helpful in the sense that the high-fidelity prototype we had before the class started was already coded in it, and it supports both iOS and Android. However, in many cases (for example, swiping from screen to screen, and supporting AR functionality), React did not include satisfactory libraries to use. In those instances, we needed to write a lot of the code ourselves, even modifying existing libraries.

How to Download

Download Quest within the Expo Client app from our site here. (or scan the QR code)

Business Plan

Our team is full of young people knowledgeable about computer science and design. We all live near or on Stanford's campus, and we're all passionate about making Quest a beautiful product. Because of this, we are qualified to attempt commercialize Quest.

As a team, we filled out a Lean Canvas (in an attempt to create a Lean Business Model) and learned a lot about what the advantages and disadvantages would be if we tried to commercialize Quest. We gathered that our biggest problem would be getting people to hear about and use our app. Being that we're just college students with relatively low amounts of money for outreach, this is the biggest obstacle for us in the commercialization process. Fortunately, we came up with a plethora of solutions to the proposed issue. Ads could aid the monetary aspect, but we didn't like the idea of including them in our app. Free giveaways/discounts of features, infrequent reminders, and daily optional quests created by our company or other retails (for example, Walmart makes daily quests with the message being some coupon) are just some ideas for ways we could engross our users on a more daily basis.

Quest is targeted mostly for people who live some distance away from a friend or significant other, with whom they wish to sustain an intimate relationship. However, it is not restricted to that population: young adults and teens in any proximity could use the app just due to its novelty and unique AR games. Quest's ability to promote meaningful messaging is valuable in the sense that it's attractive for anyone to use, which is great for us as its creators.

How we will make money is the big question. Together we agreed that we shouldn't have in-UI ads. But paying a small fee for the purchase of new Quest themes would be good ideas to generate some income, we also had some other more far-fetched ideas that might just work. These included partnering with other companies (like Starbucks) so Quests could provide users the option to buy their gift cards as the gift. Selling anonymized user data is also a way to monetize. Allowing the emojis one collects on a quest to be transformed into a kind of currency on the app (so users could have the option to purchase more Quest currency with real cash), and other options have been on our minds as well. We realize that things like salaries, marketing costs, and the server costs will all be demanding, but with the right approach we are optimistic that Quest could yield dividends.

At the end of the day, our impact will be what we've been saying this whole report - to improve relationships among people who live far away. It won't be about the success of our hypothetical company. As a team, we care much more about the success and feedback associated with our product than how much money we might receive as a result!

Summary

In the world today, everything is electronic - mail, currency, gaming, learning, and many other aspects of life can all be done on smart devices. It is our hope to have provided friends and lovers with an easy and unique way to send intimate messages through Quest. After all, it's unrealistic to expect letter-sending to remain a popular method of communication in years to come. With Quest, users are able to send completely personalized messages accompanying fun AR journeys, (of appropriate length), to their friends. By spending more time thinking about friends in the message-creating process and the delayed gratification of retrieving the message after an AR quest, Quest allows users to better sustain long-term friendships and relationships through more meaningful and fun communication.